THE PAPER INDUSTRY and PAPER WORLD

AN EDUCATIONAL NEWS MAGAZINE—MAY, 1949

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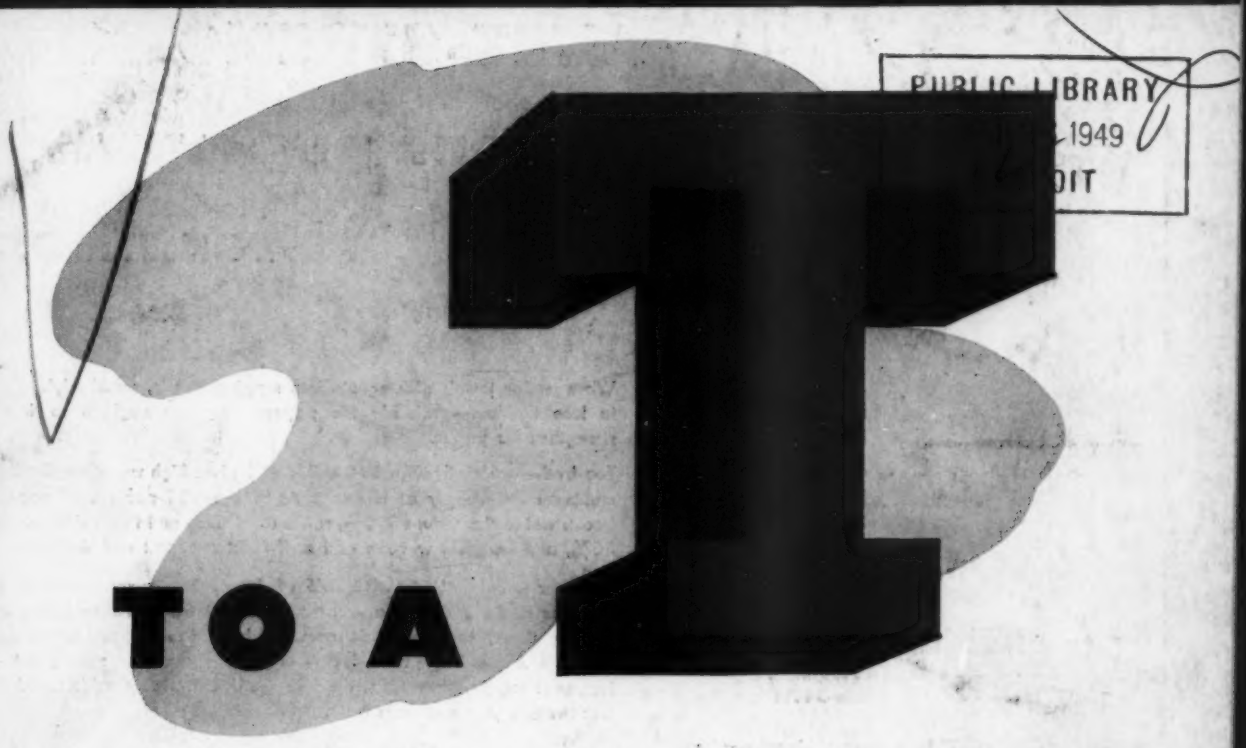


No matter what you want to make, whether it be paper, board, insulating board, or structural hard board, Downingtown designs and builds the machinery, supplying all the accessory equipment to meet your requirements "to a T." You can feel assured of the desired daily tonnage of the required quality with a minimum capital investment.

A fortunate combination of very favorable factors is the reason for this; namely, our 69 years' experience, our modern, completely integrated shop facilities, our research staff, our large, experienced engineering department and our location in the "heart" of suppliers of every type of equipment not made by Downingtown. Further, this location of Downingtown on the Lincoln Highway and the "main line" of the Pennsylvania Railroad, being within 24 hours of 65% of the paper mills in the United States, speeds up and reduces the cost of truck and rail freight shipments.

If your plans are for a new mill, or modernization to produce the quality sheet demanded by your customers at a profitable operating speed, the integrity of Downingtown will provide satisfaction "to a T," from the signing of the contract to the start-up. Call on us.

DOWNINGTOWN MANUFACTURING COMPANY

DOWNINGTOWN, PA.

DESIGNERS AND BUILDERS OF PAPER MAKING MACHINERY SINCE 1880

That's a MARKET going to pieces!

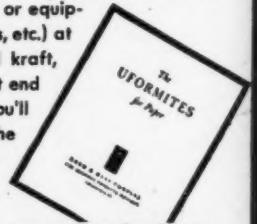
WET-STRENGTHEN your paper with Uformites

When paper towels disintegrate into sopping shreds, somebody's due to lose business—probably the papermaker who neglects to wet-strengthen his paper.

Too bad—especially since UFORMITE 475 gives high wet strength plus maximum absorbency at low cost. As little as $4 per ton of paper boosts wet Mullen values 300%, raises dry Mullen and fold values 10 to 30%, and increases wet rub and scuff resistance, wet and dry tensile.

In paper toweling, UFORMITE 475 eliminates the see-saw relationship that has made a strong, absorbent towel a hard-to-realize ideal. In twisting tissue, too, the rosin prevents breakage on paper-twisting machines. And in bags; reproduction or printing papers; glassine; tasteless, odorless, grease-proof wrappings, the UFORMITES provide the high wet strength your customers want.

And low price is not the only saving. With the UFORMITES, there's no pretreatment necessary, no special processing or equipment. Just add UFORMITE 467 (for kraft bags, etc.) at the beater, or UFORMITE 470 (for high pH kraft, groundwood, and sulfite) anywhere at the wet end after the Jordans. With the UFORMITES, you'll improve the sizing efficiency of rosin and the retention of beater additives. For full information on UFORMITES—plus samples of these resins—write today. There's no obligation.



UFORMITES for Paper

Your copy of this free booklet will answer your technical questions about the UFORMITES, and how they are used to increase wet strength. Send for it today.

OTHER CHEMICALS FOR THE PAPER INDUSTRY

AMBERLITE W-1—A water soluble polymer for improving the dry and wet tensile and Mullen, as well as the fold and the abrasion resistance of paper.

RHOZYMES BB and E-5—for enzyme conversion of starch.

TAMOL N—for effective pitch control—a dispersing agent for pigments.

TRITONS—Surface-active agents with a score of uses in paper manufacture—in caustic cooking of cotton fiber, as a dispersing agent for pigments and metallic soaps, emulsion-type coatings.

The Hydrosulfites—Reducing agents for stripping color from rag stock or for bleaching pulp.

HYAMINES—Deodorants for paperboard and glue bactericides.

UFORMITE, AMBERLITE, RHOZYME, TAMOL, TRITON, HYAMINE are *trade-marks, Reg. U. S. Pat. Off.*

CHEMICALS FOR INDUSTRY

ROHM & HAAS COMPANY

THE RESINOUS PRODUCTS DIVISION

Washington Square Philadelphia 5, Pa.

The Resinous Products Division was formerly The Resinous Products & Chemical Company

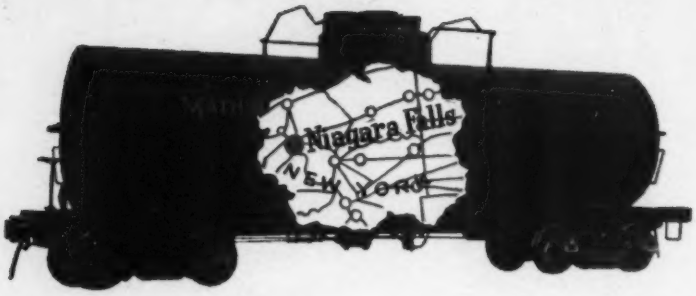
Why use Two Horses when ONE will do a Better job?

Installation after installation of Sutherlands in mills making various kinds of paper and board proves that savings of approximately 50% in horsepower are the rule, rather than the exception. With the savings in power, there is also an increase in quality, which is characteristic of all Sutherland installations. This applies even where the replaced stock preparation equipment is comparatively new, by accepted standards. So why use double the horsepower needed?... Power economies with Sutherlands make it possible for mills to increase their present production, improve quality, and save power, all in one installation. In all cases, improved quality and increased production are the result of longer-fibred pulp with a faster drainage rate....75% of all Sutherlands installed have been for modernization of mills, so our experience should be of inestimable help, both in engineering and economic recommendations. Send for our catalog, or write us, outlining your conditions and problems, which we, of course, will hold confidential.

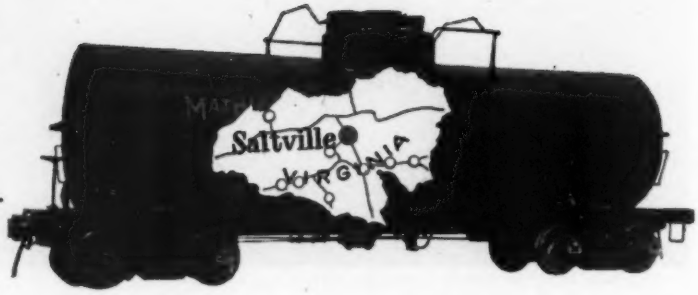
SUTHERLAND REFINER CORPORATION · TRENTON, NEW JERSEY

Manufactured in the United States by Valley Iron Works Co., Appleton, Wisconsin

Sutherland Refiner Ltd., Windsor Hotel, Montreal, P. Q.



three-point Dependability



Out of Mathieson's three producing points—each geographically located in principal caustic-consuming areas—roll hundreds of modern tank cars speeding to meet industry's need for high-grade caustic. The strategic location of these three plants permits substantial savings in shipping costs...provides *dependable* sources of caustic to consumers having several plants in areas served by Mathieson—*one* source of supply with *three* producing points.
Mathieson Chemical Corporation,
60 East 42nd Street, New York 17, N.Y.

Specify Mathieson

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Caustic Soda . . . Soda Ash . . . Bicarbonate of Soda
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Anhydrous & Aqua . . . HTH Products . . . Dry Ice
Carbonic Gas . . . Sodium Chlorite Products
Sodium Methylate

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and PAPER WORLD

(Reg. U. S. Pat. Off.)

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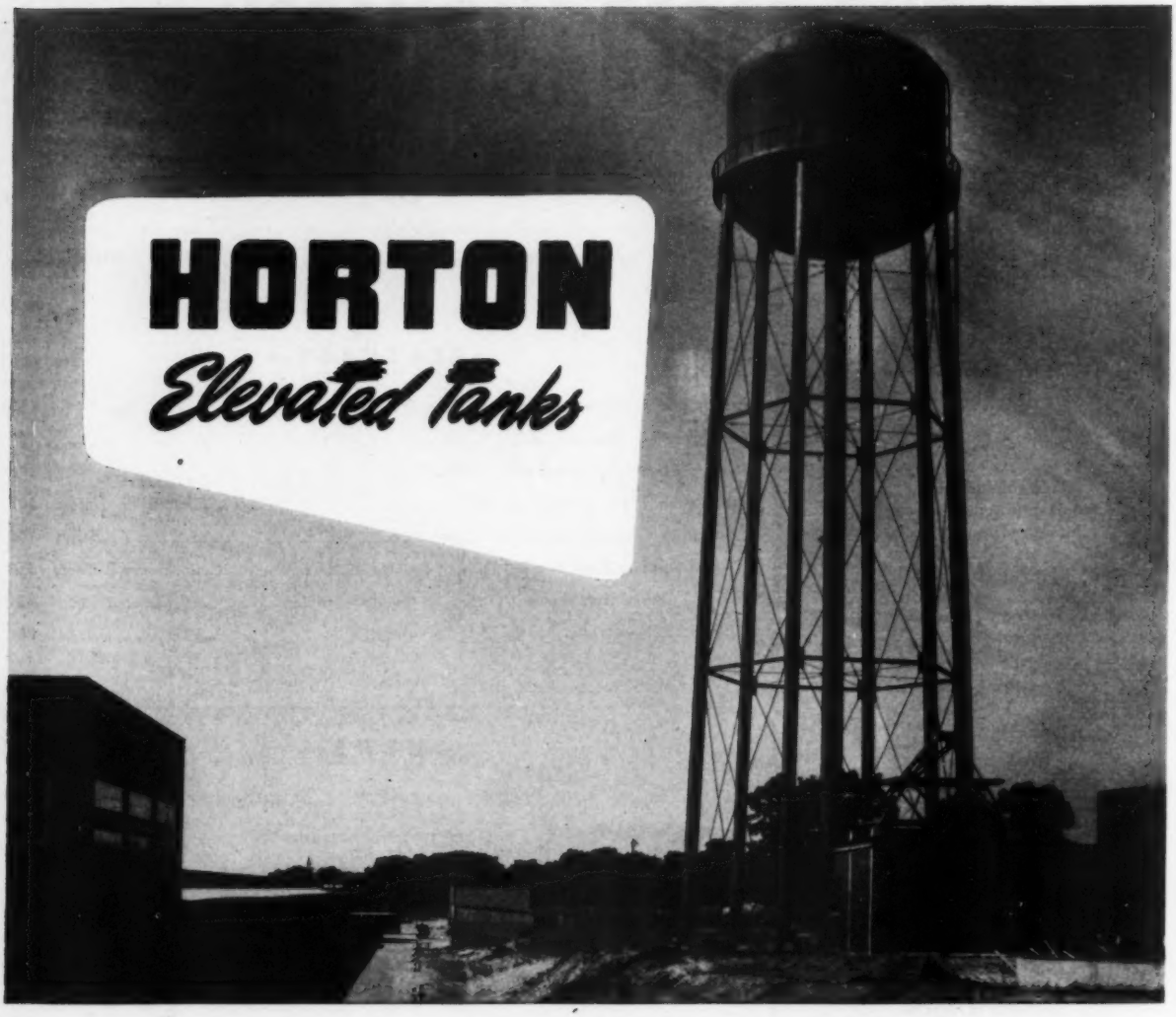

First line of defense against fire...

A HORTON elevated tank and an automatic sprinkler system are your best defense against fire. They start to fight back just as soon as a fire breaks out, before it has a chance to spread. They go to work at the heart of a fire, where fighting is most effective, and which often cannot be reached by any other fire-fighting method. A sprinkler system backed by an elevated tank may mean the difference in your plant between a few minutes' interruption and a costly shutdown.

Horton ellipsoidal-bottom elevated steel tanks are built for use with automatic sprinkler systems and for general industrial service in capacities from 15,000 gals. to 500,000 gals. As a result of their butt-welded steel construction they are smooth, graceful structures which are economically maintained. All parts of the tanks are accessible for inspection and painting.

A new bulletin, with illustrations in full color, describes these Horton tanks in detail. Write our nearest office for your copy.

The Horton elevated tank shown above is located at the United Wallpaper plant at Montgomery, Illinois. It is a 150,000-gal. unit, 150 ft. to bottom, which furnishes 50,000 gals. of water per day for general service, and holds 100,000 gals. in reserve for fire protection. The entire plant is protected by a sprinkler system.

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Philadelphia, 3.....1653—1700 Walnut Street Building
Salt Lake City, 1.....1527 First Security Bank Building
San Francisco, 11.....1217—22 Battery Street Building
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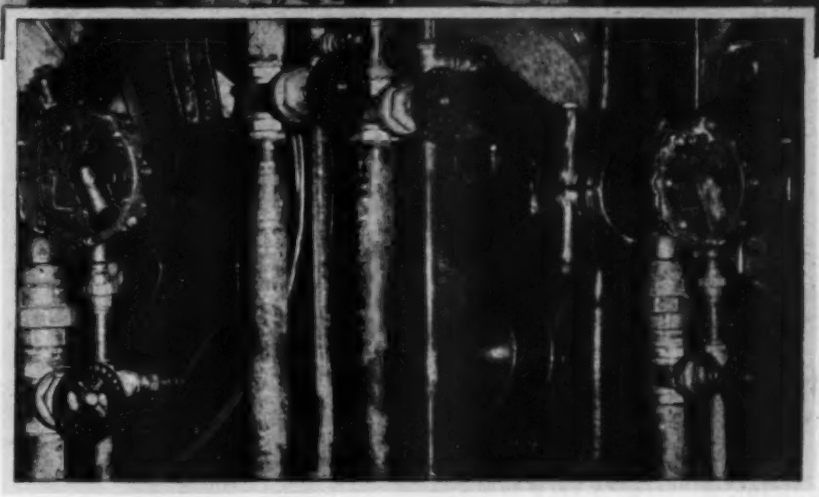
Tulsa, 3.....1651 Hunt Building

Plants in BIRMINGHAM, CHICAGO, SALT LAKE CITY, and GREENVILLE, PA. In Canada: HORTON STEEL WORKS, Limited, FORT ERIE, ONT.

OIC VALVES
SLASH MAINTENANCE COSTS FOR SONOCO PRODUCTS CO.



In the Hartsville, S. C., plant of Sonoco Products Co., OIC Valves play an important part in the manufacture of such paper specialties as textile cones, mailing tubes, drug cans, electrical tubes, fuse tubes, spools and paper mill cores.

•

Most of the small valves shown here on a Sonoco paper machine are 2-inch size. Other OIC *Valves, in a wide variety of trims and sizes, are used on lines for such varied services as Paper Stock, Paste, Steam Power, Process Steam, Compressed Air, Water, Fuel Oil and Air Conditioning Equipment.*

SONOCO, one of the nation's leading manufacturers of paper specialties, has learned that OIC Valves cost less, over the years, than any other valves. Sonoco's own long-kept maintenance records furnish the proof!

Reasons? Plenty!

OIC Valves feature heavier construction to control pressures and stresses safely! Their streamlined design protects the flow from turbulence. Leakproof joints guard against pressure drop. Wedges of heavy I-Beam design control the flow with positive action. Integral body ribs are precision-designed — effectively reduce vibration and wear.

All these and many more outstanding features tell why Sonoco and hundreds of other leading valve users find OIC the "Pace-Setter in Valves"!

SEND FOR YOUR FREE COPY OF OIC'S VALUABLE VALVE CROSS REFERENCE CHART

Easy to use — saves you time and money! Simply check the number of the valve you wish to replace, look in the chart, and you'll find the right OIC valve. Write to The Ohio Injector Co., Wadsworth, Ohio for your free copy.

OIC

SETS THE PACE IN VALVES

STEEL • IRON • BRONZE

0-349-15

NEW SHEAVE

Another *Texrope* Engineering Triumph

AUTOMATIC SHEAVE DOES COMPLETE JOB!

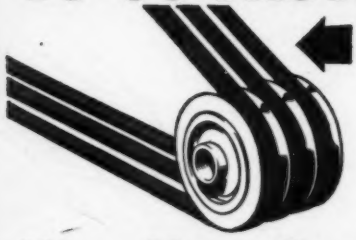
- ★ Instant speed control at lower cost than ever before
- ★ Covers most speed changing needs from 3 to 20 hp
- ★ Extremely simple — one sheave does all
- ★ No need to stop machine or take load off
- ★ Infinite variation over approximately 200% speed range
- ★ Easier starting—sheave adjusts to load.

HERE IS THE SIMPLEST, lowest cost way ever devised for changing machine speeds without stopping the machine. Simply move the motor forward to increase speed and move it back to decrease. The new *Vari-Pitch* Automatic Sheave adjusts to the new belt position *automatically*. Other parts of drive are standard *Texrope* drive components.

ALLIS-
Originators of the

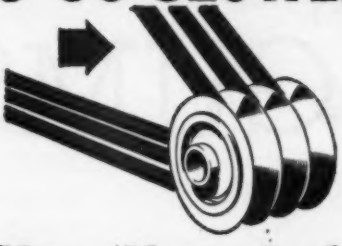
Changes Speed Without Stopping

TO GO FASTER



Move Motor Forward

TO GO SLOWER



Move Motor Back

ONE HAND DOES IT...*While Motor is Running*

This new method of speed control will lower drive costs in nearly every industry where variable speed drives are used. It will make possible savings in many industries where variable speed is not now used because of high initial cost.

Find out now how this new idea in speed control can save money for *you*.

For details see your A-C Authorized Dealer or Sales Office or write for Bulletin 20B7223. *Texrope* and *Vari-Pitch* are Allis-Chalmers trademarks. A-2708

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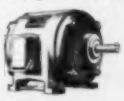
by Allis-Chalmers Authorized Dealers, Certified Service Shops and Sales Offices throughout the country.



MOTORS — ½ to 25,000 hp and up. All types.

CONTROL — Manual, magnetic and combination starters; push button stations and components for complete control systems.

PUMPS — Integral motor and coupled types. Sizes and ratings to 2500 GPM.

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CORN SYRUPS

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Corn Products Department

ANHEUSER-BUSCH, INC.

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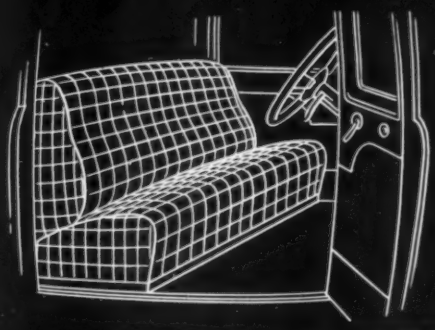

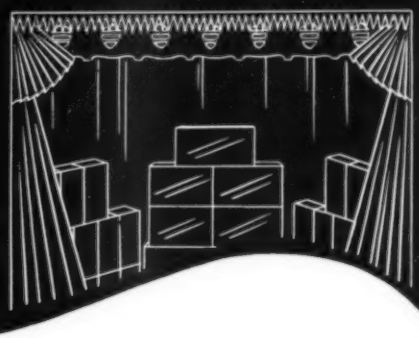

Du Pont offers:

Lithosol* Red CSP Paste
Lithosol* Fast Yellow HV Paste
Monastral* Fast Blue BWD
Monastral* Fast Green GWD
Halopont* Brilliant Pink 2B
Halopont* Brilliant Violet N
Du Pont Brilliant Crocein FL Extra Conc.
Pontamine* Fast Yellow BBL Conc. 125%
Pontamine* Fast Yellow NNL Conc. 175%
Du Pont Brilliant Paper Yellow Extra Conc. 125%
Pontamine* Fast Turquoise 8GL Conc. 150%

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TIME SAVED in Layout . . . TIME SAVED
Because Pipe Can be Cut in Advance . . .
TIME SAVED Lining Up and Fitting . . . .
TIME SAVED in Welding . . . . . by the
EXCEPTIONAL DIMENSIONAL
ACCURACY of MIDWEST
Welding Fittings
ASA TYPE
MIDWEST "LONG TANGENT"
SIZES 2" to 12"
90° ELBOWS
REDUCING ELBOWS
LATERALS
CROSSES
REDUCING-ON RUN TEES
ASA TYPE
MIDWEST "LONG TANGENT"
45° ELBOWS
180° RETURNS
TEES
SLEEVES
SHAPED NIPPLES
CAPS
MIDWEST WELDING FITTINGS IMPROVE PIPING DESIGNS

Many large users of pipe welding fittings report that Midwest Welding Fittings save them important time . . . and money . . . because of their unusual accuracy to published dimensions and their exceptional uniformity. These advantages did not just happen . . . they are direct results of the unique Midwest manufacturing methods.

But savings in time and cost are not the only advantages offered by Midwest Welding Fittings. Simplified and improved piping design is also often possible. For example: the Midwest Reducing Elbow (available in sizes through 12") decreases pressure drop and turbulence when used instead of a standard elbow and reducer (it also saves more than ⅓ of the welding). Midwest Long Tangent Elbow removes weld from point of maximum bending stress and is designed to permit use of slip-on flanges. Midwest Saddles compensate for weakening of header body resulting from metal removal for nozzle opening. Midwest Sleeves relieve butt welds of bending and tensile stress. There is a distributor near you . . . it will pay you well to call on him for your welding fitting requirements.

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Main Offices: 1450 South Second Street, St. Louis (4), Mo.

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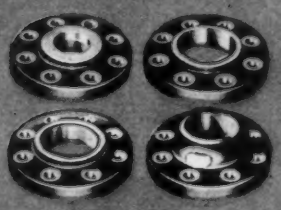
4 PLANTS ARE BETTER THAN 1

LAP-JOINT STUB ENDS

REDUCERS

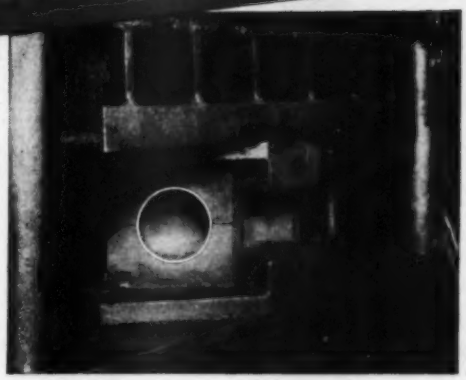


FLANGES

SADDLES

AND REDUCE COSTS . . .

Here's Why TIME IS SAVED

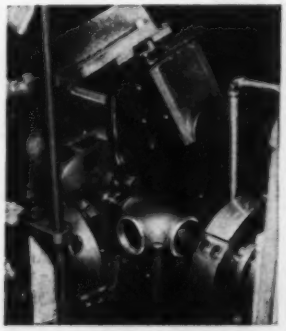


SIZING IN COMPRESSION

Midwest Elbows are first made slightly oversize. They are then reheated to forging temperature and brought to final size in compression dies. In addition to relieving forming and welding stress, this assures true circular cross section, uniform wall thickness and accurate radius, included arc and tangents.

SPECIAL MACHINING

Special machines developed by Midwest simultaneously bevel the ends of Midwest Welding Fittings. This assures exact included angles and holds center-to-end dimensions well within tolerance specifications.



FINAL INSPECTION

Every Midwest Welding Fitting is individually checked to insure that the high standards of precision are maintained.

9 RUBBER COVERED KRAFT BLEACH WASHERS

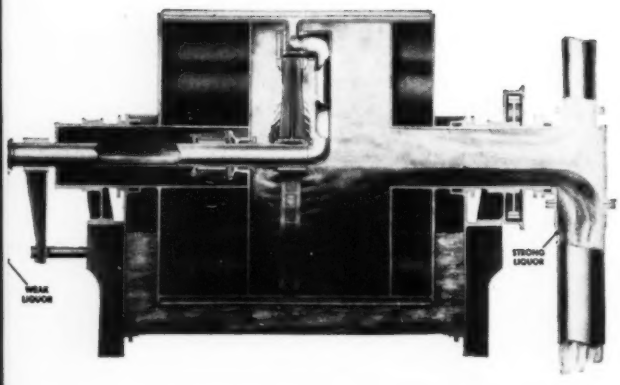
3 BROWN STOCK WASHERS

2 RUBBER COVERED BLEACH STOCK DECKERS

2 ALL STEEL BROWN STOCK DECKERS

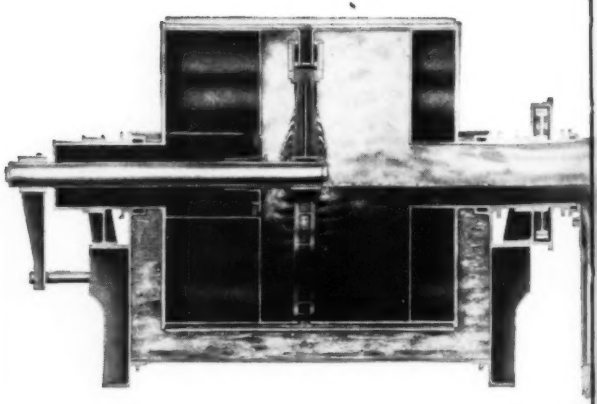
ALL ADD UP TO

16 OLIVER "RINGVALVE"F



OLIVER "RINGVALVE" WASHER

[with Strong Liquor Separation]



OLIVER "RINGVALVE" DECKER

[Ringvalve Principle Similar to Washer]

. . . A Record Order for "Ringvalves"!

There's something distinctly different about the Oliver Ringvalve Filter and, for most chemical pulp washing or deckering jobs, something distinctly superior. A close study of its design and of its operating principle discloses the features which enable it to produce better results as a washer or decker:

"FILTERS

- high hydraulic capacity
- operable with dilute stock, thus promoting more uniform and better sheet formation
- minimum resistance to flow—no internal piping
- capable of handling sustained peak loads
- multi-stage washing plus re-washing on fewer units using counter-current washing
- single or two-stage washing on one unit
- operable by barometric leg
- clearance between drum and vat prevents stock accumulation
- external adjustment of ringvalve

With this order for 16 Oliver Ringvalve Filters, the number of Ringvalves on order or in service now totals several score. And the number of repeat orders, too, is steadily mounting. Both rising sales curves attest the popularity of this distinctly different and distinctly superior washer and decker.

UF INC.

OLIVER UNITED FILTERS INC.

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On the Way...

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Posey Stainless Clad Pulp Digester...
13′ O. D. x 40′ long...
en route to leading paper manufacturer.

Consult Posey Iron Works about your requirements—and you're on the way to obtaining outstanding pulp digester service. Posey digesters are fabricated from alloys that provide high resistance to black liquor and other corrosives. Posey "know-how" and engineering skill reduce maintenance . . . often point the way to savings in equipment cost. Weld is stable and digesters are properly stress-relieved throughout. Write today and describe your service conditions. No obligation.

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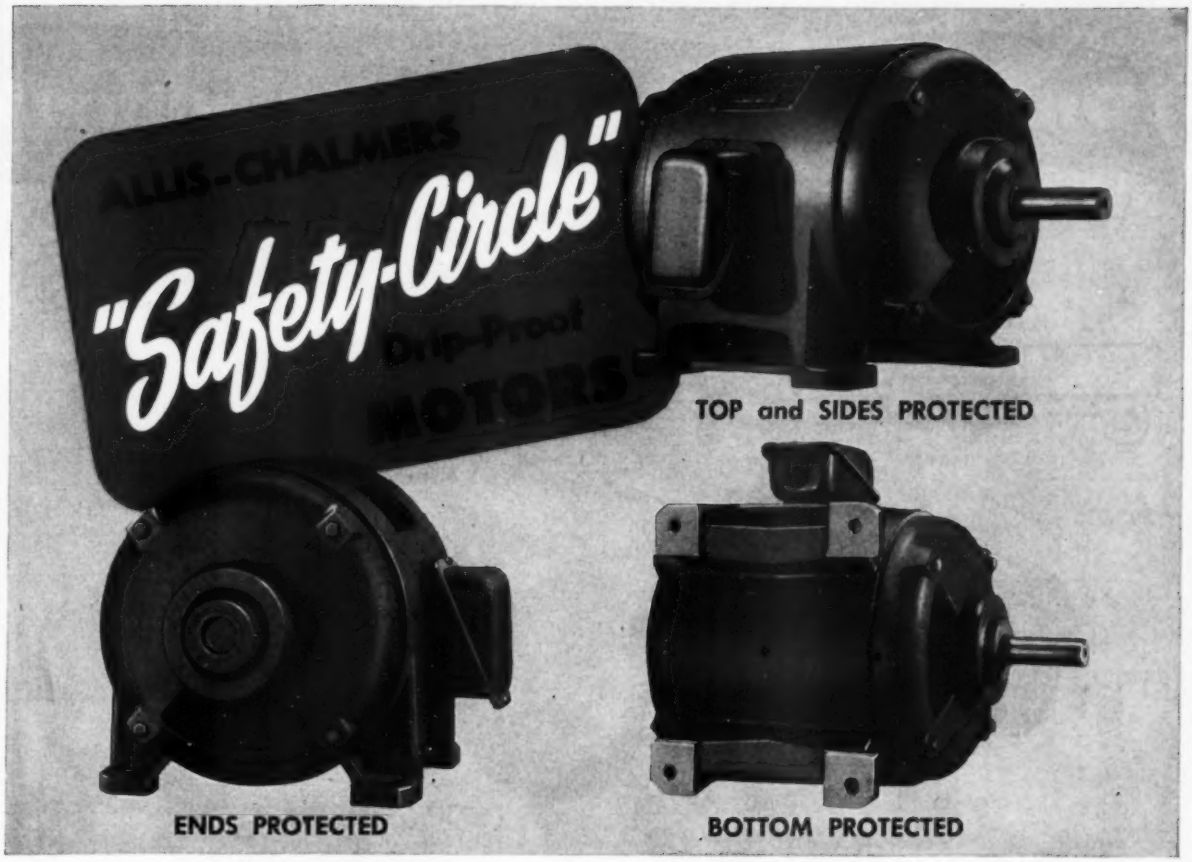
EXPERIMENTAL WORK **SULPHATE**
SODA **SULPHITE**



Get All-Around Motor Protection with

SAFETY-CIRCLE

THAT SOLID CAST IRON FRAME protects SAFETY-CIRCLE working parts against physical damage from every angle. The completely enclosed bottom provides extra protection and extra strength. End brackets are drip-proof at no premium.

Because the frame is cast iron, it is resistant to rust and corrosion. It withstands physical abuse and will not distort.

Protected Inside, Too

SAFETY-CIRCLE protects against internal breakdown with multiple-dipped and baked stator and die-cast aluminum rotor. *Ball bearings are factory-lubricated and need no attention for years.* Wide open internal construction and large fans keep temperatures well within rated limits.

Don't be satisfied with a motor that gives you less than full protection. Insist on the extra protection of SAFETY-CIRCLE.

For complete details on SAFETY-CIRCLE advantages, see your A-C Authorized Dealer, Sales Office, or write for Bulletin 51B6210B. Sizes from 1 to 20 hp, 326 frames and smaller. Safety-Circle, Texrope and Vari-Pitch are Allis-Chalmers trademarks.

A-2689

ALLIS-CHALMERS, 991A SO. 70 ST.
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ALLIS-CHALMERS

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Applied . . .
Serviced . . .

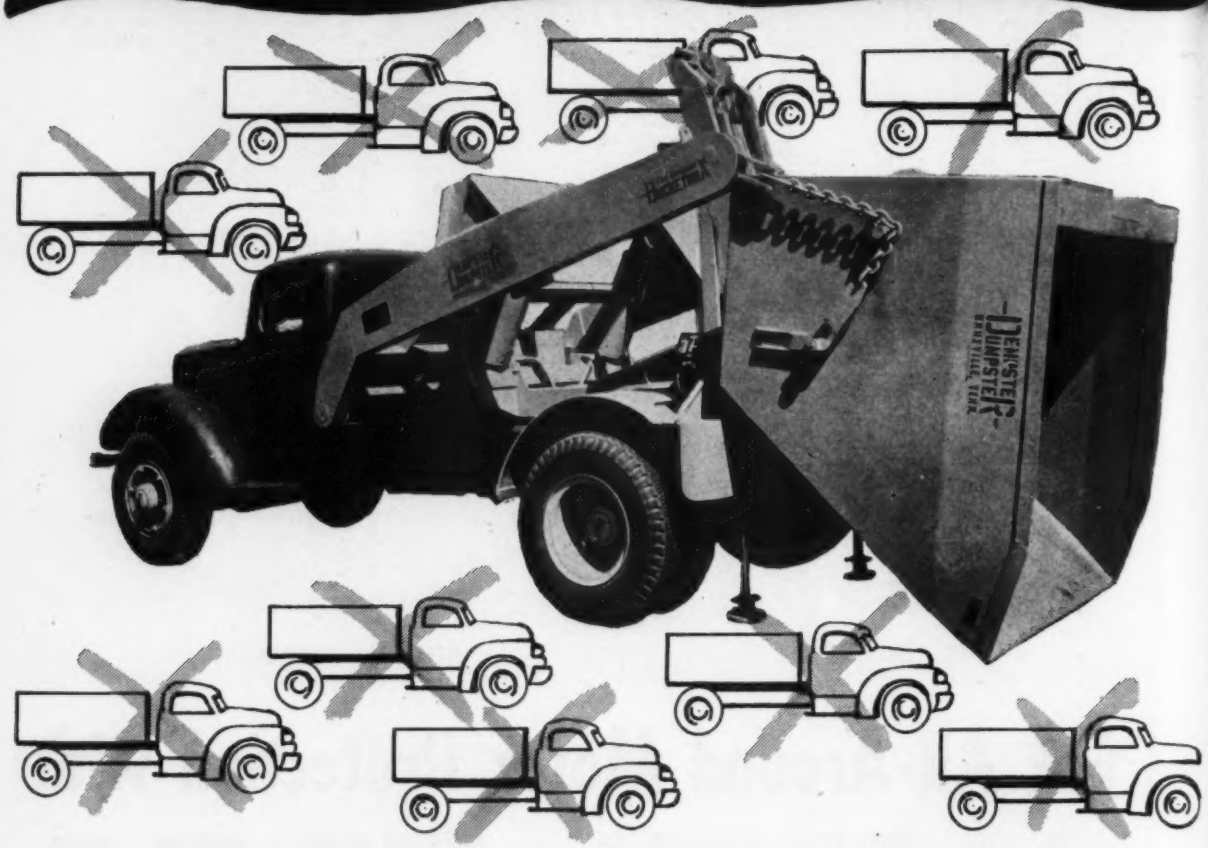
by Allis-Chalmers Authorized Dealers, Certified Service Shops and Sales Offices throughout the country.

CONTROL — Manual, magnetic and combination starters; push button stations and components for complete control systems.

TEXROPE — Belts in all sizes and sections, standard and Vari-Pitch sheaves, speed changers.

PUMPS — Integral motor and coupled types. Sizes and ratings to 2500 GPM.

One Dempster-Dumpster with 99



Being a large operation, this copper smelter required ten trucks and their crews, a series of push cars, a train car system and loading crews to handle over twenty different kinds of materials on relatively short hauls between plant buildings and outside of the grounds. The materials handled included, scrap of all descriptions, trash, rubbish, new and used brick, excavation spoil, waste oils, filter cake, dust, sand, gravel, cement, fire clay and many others.

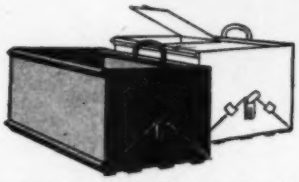
A large majority of the handling, re-handling, storage, truck and car equipment and crews standing idle, was eliminated by the Dempster-Dumpster System. Simply stated, this system provides quick pick-up of pre-loaded containers for hauling, dumping or moving material to another location. The three pictures below show how it operates. The left illustration shows the Dempster-Dumpster truck hoisting unit approaching a loaded container. Two chains are attached and the driver returns to controls in the cab. In the center photo, loaded container is hydraulically raised into carrying position. Controls in the cab permit dumping as illustrated at right. You too, may be able to adapt the Dempster-Dumpster System of Materials Handling to your business at tremendous savings. Let one of our engineers discuss this possibility with you.

Containers replaces 9 trucks....

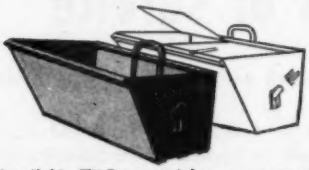
Over $50,000 saved annually . . . in this Copper Plant through faster, more efficient, materials handling

Here, in plain language, is what happened to Materials Handling costs after the Dempster-Dumpster System of Materials Handling was installed in a large Western copper smelting plant. A comprehensive Dempster-Dumpster survey had previously revealed costly delays, unnecessary handling and rehandling of materials, and much time wasted by loading crews. All have been eliminated to the tune of $50,000 savings annually. Fast pick-up, hauling and dumping of pre-loaded Dempster-Dumpster containers has replaced the old method of plant hauling. As a result, nine of the ten trucks formerly detailed for this work were eliminated or put on other work. Ninety-nine detachable containers, built in over 20 sizes and designs for the specific materials they were to handle, were spotted at material accumulation points throughout the plant. Some containers, provided with roller bearing casters, are rolled to indoor accumulation points. Some are handled by fork trucks, other by overhead cranes within plant buildings. As containers are filled, the Dempster-Dumpster truck hoisting unit and one man, the driver, picks each container up, hauls it to its destination, dumps it and returns the empty container for refilling or, loaded container is lowered at any point and left if desired. When you consider that pick-up and dumping of these detachable containers takes less than 60 seconds, and that the entire operation works to an on-the-run schedule, you will realize how one truck hoisting unit can handle 99 containers and do the work formerly requiring ten conventional trucks.

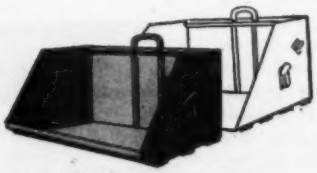
In the panel below are shown the basic types of Dempster-Dumpster Containers used in this installation. The basic containers can be altered with lids, casters, hose and chute connections, etc., to handle accumulations of any type material whether it be liquid, solid, dust, gas, light or heavy materials.



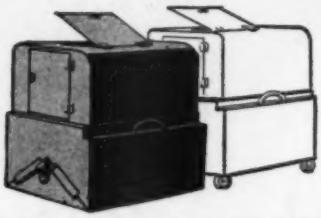
Forty-nine open top, drop-bottom containers in 3, 4, 8 and 10 cu. yd. capacities were spotted at 38 locations throughout the smelter operation. Four of these were 10 cu. yd. containers fitted with two end doors and a circular top opening for chute loading. Three of the 34—4 cu. yd. drop-bottom containers in this group were equipped with self balancing spring lids for special use.



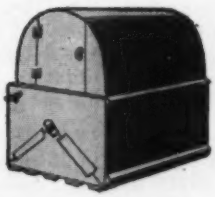
Ten water tight, Tilt-Type containers were required to handle liquids or moist materials. Four of these were open top of 1½, 3 and 4 cu. yd. capacities for four locations. One 4 cu. yd. container with self balancing spring lids was provided at Lab Sample Mill. Three containers, with self balancing lids provided with pipe inlets, were supplied for receiving waste oil at three separate locations. Two 3 cu. yd. containers having three separate compartments with individual lids for each compartment, were required for the zinc electrolytic plant.



Two 4 cu. yd. skip-type, with lip, containers and two 4 cu. yd. skip-type, flat-bottom, containers were spotted at two locations. One 6 cu. yd. flat-bottom, skip-type container was furnished.



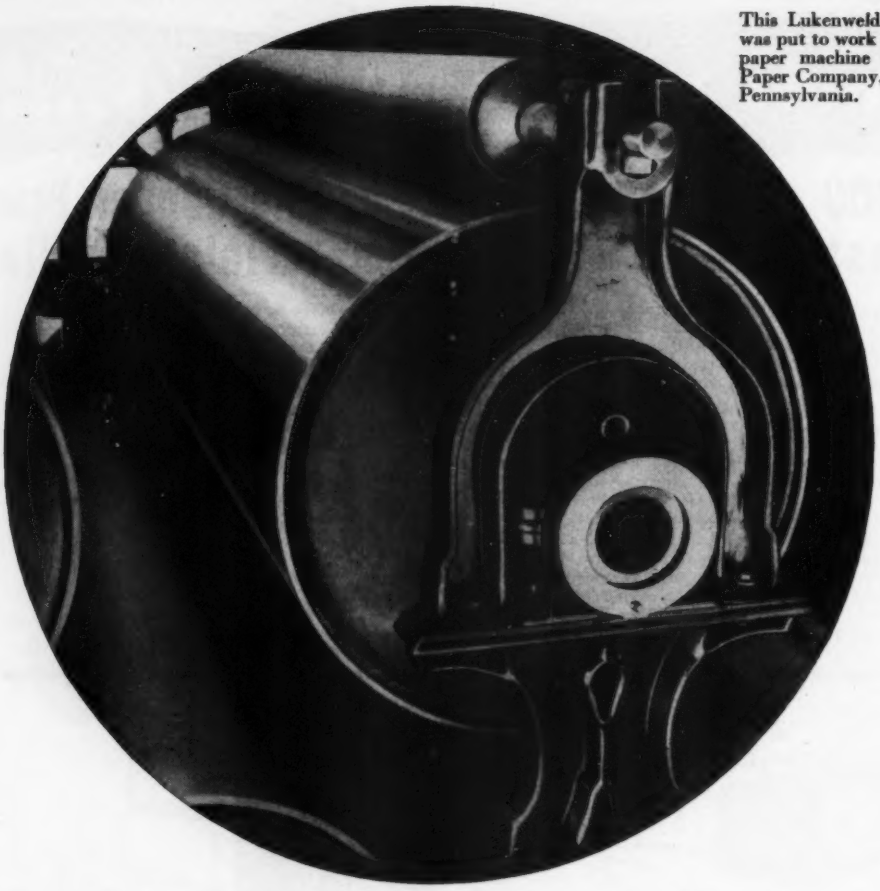
Thirty-three Universal-type containers in 6 and 10 cu. yd. capacities were spotted at 33 locations to receive trash, rubbish and other bulky materials. Two of these were mounted on roller bearing casters for movement to indoor loading locations.



Two 10 cu. yd. Apartment-type containers were spotted at the main office and laboratory office to receive large accumulations of waste paper and trash.

DEMPSTER DUMPSTER
TRADE MARK REG.
SYSTEM

DEMPSTER BROTHERS, INC., 739 Dempster Bldg., Knoxville 17, Tenn.



This Lukenweld Steel Drier Roll was put to work early in 1934 on a paper machine at Downingtown Paper Company, in Downingtown Pennsylvania.

This Lukenweld Steel Drier Roll has stayed *round* through 14 years of service

Recently removed for the repair of a worn journal caused by faulty lubrication, this 14-year-old roll gave Downingtown Paper Company's engineers an opportunity to check every detail. Their findings confirmed these facts, similarly proved by previous examinations of dozens of other Lukenweld Rolls:

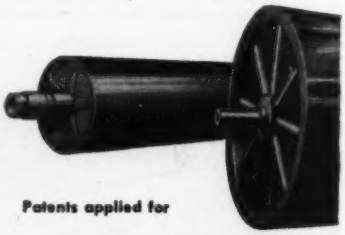
STABLE DIMENSIONS. Although in use on a paper machine ever since 1934, this 42″ Lukenweld Steel Drier Roll is still round to within a tolerance of 0.004″. (The machining tolerance was ±.005″.) The tolerance has scarcely changed in over 14 years.

LONG-LIVED. On the interior surfaces of the chamber in which steam circulates, there were no evidences of corrosion.

STRONG AND SAFE. After the journal was repaired, this Lukenweld Roll was ready to go back to work, sound as the day it was installed 14 years ago.

Hundreds of Lukenweld Jacketed Steel Drier Rolls, at work in various industries, have proved they dry faster, better and safer. *Faster* because of reduced wall thickness and higher efficiency. *Better* because surface temperatures are even and constant. *Safer* because of their welded steel construction—steam pressures as high as 350 psi are permissible.

For Bulletin 358 giving data on drier rolls, or for help on complete machines, write Lukenweld, Division of Lukens Steel Company, 408 Lukens Building, Coatesville, Penna.



Patents applied for

We'll lend you "LUKENWELD", a 16mm motion picture with sound, highlighting our methods, facilities and products. Running time: 20 minutes. Write for booking date.

LUKENS
LUKENWELD DIVISION

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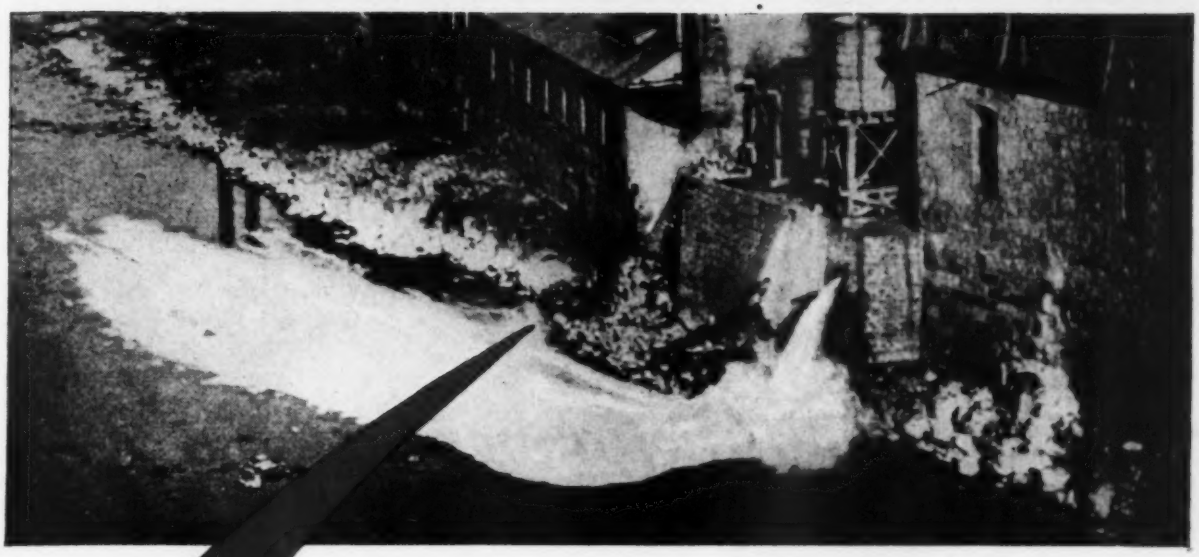

General Chemical "ALUM"

For Treatment of Industrial Wastes

Treatment of industrial wastes to prevent harmful effects on public waters is becoming increasingly important. Throughout the process industries, scores of concerns have found a solution to their problem in the use of General Chemical Aluminum Sulfate.

Laundries, paper mills, dairies, textile mills, canning plants, oil wells and packing houses across the nation report General Chemical "Alum" useful in purifying wastes; coagulating and settling suspended matter; reducing coloring matter, including many dyes.

Fifty years of working with the water industry on chemical methods of clarifying water has given General Chemical extensive experience in the treatment of sewage and waste waters. This broad knowledge may be of value to you as it has to so many others.

Assistance of the company's technical service specialists is available on request—and without obligation. For help on your industrial waste treatment problems, write or phone the nearest General Chemical office.

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Annual Convention

HADDON HALL
Atlantic City, N.J.

June 15-17, 1949

TENTATIVE PROGRAM

June 15, 1949

9:30 A.M.	Business Meeting
10:30 A.M. to 12:30 P.M.	General Conference
2:30 P.M. to 5:00 P.M.	Group Meetings Wood Room and Woods Operations Mill Maintenance Coated Papers

June 16, 1949

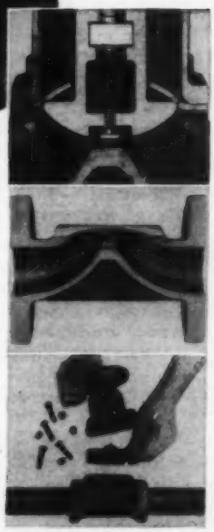
9:30 A.M. to 12:30 P.M.	Group Meetings Fine Paper and Tissue Sulphite Board
2:30 P.M. to 5:00 P.M.	Group Meetings Kraft Power Graphic Arts

June 17, 1949

8:00 A.M.	Men's Breakfast
9:30 A.M. to 12:30 P.M.	General Conference Materials Handling in Pulp and Paper Mills
2:30 P.M. to 5:00 P.M.	General Conference Industrial Relations in Pulp and Paper Mills
7:30 P.M.	Banquet and Dance

Simple as pinching a rubber tube

A GRINNELL-SAUNDERS DIAPHRAGM VALVE works on a simple principle . . . it pinches tight for positive closure and opens wide for streamlined flow. The working parts of the valve are completely isolated from the fluid . . . no corrosion, no contamination and no leaks. Choice of diaphragm material. Body materials . . . cast iron, malleable iron, bronze, aluminum, stainless steel. Body linings . . . glass, lead, rubber or synthetics.



NO METAL-TO-METAL SEAT . . . The large contact area on which this flexible diaphragm seats gives positive closure even when grit, scale or other solid matter is temporarily trapped.

MINIMUM RESISTANCE TO FLOW . . . Smooth streamlined fluid passage without pockets prevents accumulation of sludge and reduces friction resistance to a minimum.

MAINTENANCE REDUCED . . . The diaphragm is the only part that normally wears out. Replaced in a few minutes without removing valve from line.

Available in various combinations of valve bodies and operating mechanisms.

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Grinnell Company, Inc., Providence 1, Rhode Island. Branches: Atlanta • Buffalo • Charlotte • Chicago • Cleveland • Cranston • Fresno • Kansas City • Houston Long Beach • Los Angeles • Milwaukee • Minneapolis • New York • Oakland • Philadelphia • Sacramento • St. Louis • St. Paul • San Francisco • Seattle • Spokane

AA-198

IMPORTANT NOTICE

TO ALL OWNERS AND OPERATORS OF *Camachine* MILL TYPE WINDERS

PNEUMATIC PRESSURE CONTROL

a Spectacular Improvement

IN CUTTER WHEEL PERFORMANCE

is now available for application to all existing mill type Camachines, both standard and narrow width. This cutter unit has also been adopted as standard on all new Camachine mill type winders (models 14, 18, 19 and 20).

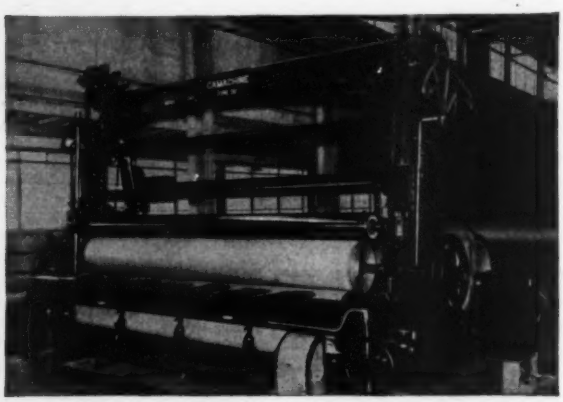
HERE'S WHAT IT DOES: With the new Camachine Pneumatic Cutter Units, uniform pressure is maintained on the complete set of cutter wheels, regardless of how many units are operated at the same time, and regardless of variations in the diameters of the cutter wheels. Also, the pressure is set and controlled at one point for the entire line, eliminating the need for individual adjustment of each cutter unit.

Pneumatic pressure control eliminates the danger of applying excess pressure on the individual unit—a fault which, on old-style spring-loaded cutters, often resulted in excess wear on the cutter wheels and costly downtime due to spring breakages.

Pressure on the entire line is controlled through a hand-operated valve. Changes of pressure to accommodate different thicknesses of paper or paperboard can be made instantly through a simple turn of the valve. In the event of a web break the cutter wheel pressure is released at once.

The Camachine Pneumatic Cutter Unit is one of several important post-war improvements which are offered as standard equipment on all new mill type Camachines. The extensive engineering, research and manufacturing facilities of the Cameron Machine Company are devoted exclusively to producing the world's most efficient slitting and roll-winding equipment.

BELOW: Camachine 20. Speeds up to 5000 fpm on newsprint.



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FOR FAST, TOP QUALITY ROLL PRODUCTION

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Short Subject on AUTOMATIC CONTROL

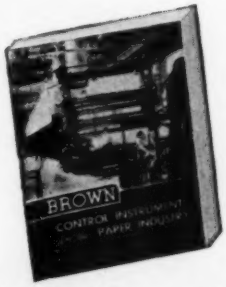
...featuring the *ElectroniK* Potentiometer!

The *ElectroniK* Potentiometer was designed to meet the urgent need for a new concept in precision and accuracy for automatic control. It fills that need and has set a record for outstanding performance in the Paper Industry.

In addition to such benefits as unmatched speed, greater accuracy and high reproducibility, this potentiometer provides the extra advantage of minimum maintenance.

Applications for the *ElectroniK* Controller are as varied as the need. It is particularly valuable in the measurement and control of speeds, temperatures, pH, conductivity and moisture content ... from chip-board to coated papers.

Leading paper mills and converters are turning to the *ElectroniK* System to cut costs and increase product quality.



Write, today, for your copy of Bulletin 2801..."Control Instruments for the Paper Industry."

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Surface Sizing on Wax-Coated Paperboard

Kelgin, the modern algin surface size, assures an excellent wax film on paperboard used in milk containers and similar applications. That's because Kelgin gives increased surface density—makes possible a smooth, high finish.

Easy and economical to use, Kelgin causes no foaming in the sizing solution, nor does it cause pick. You can save money in sizing costs with the correct Kelgin formula for your milk container stock or similar board. Write to our nearest regional office for full information in terms of your particular sizing problem.

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LOS ANGELES—14

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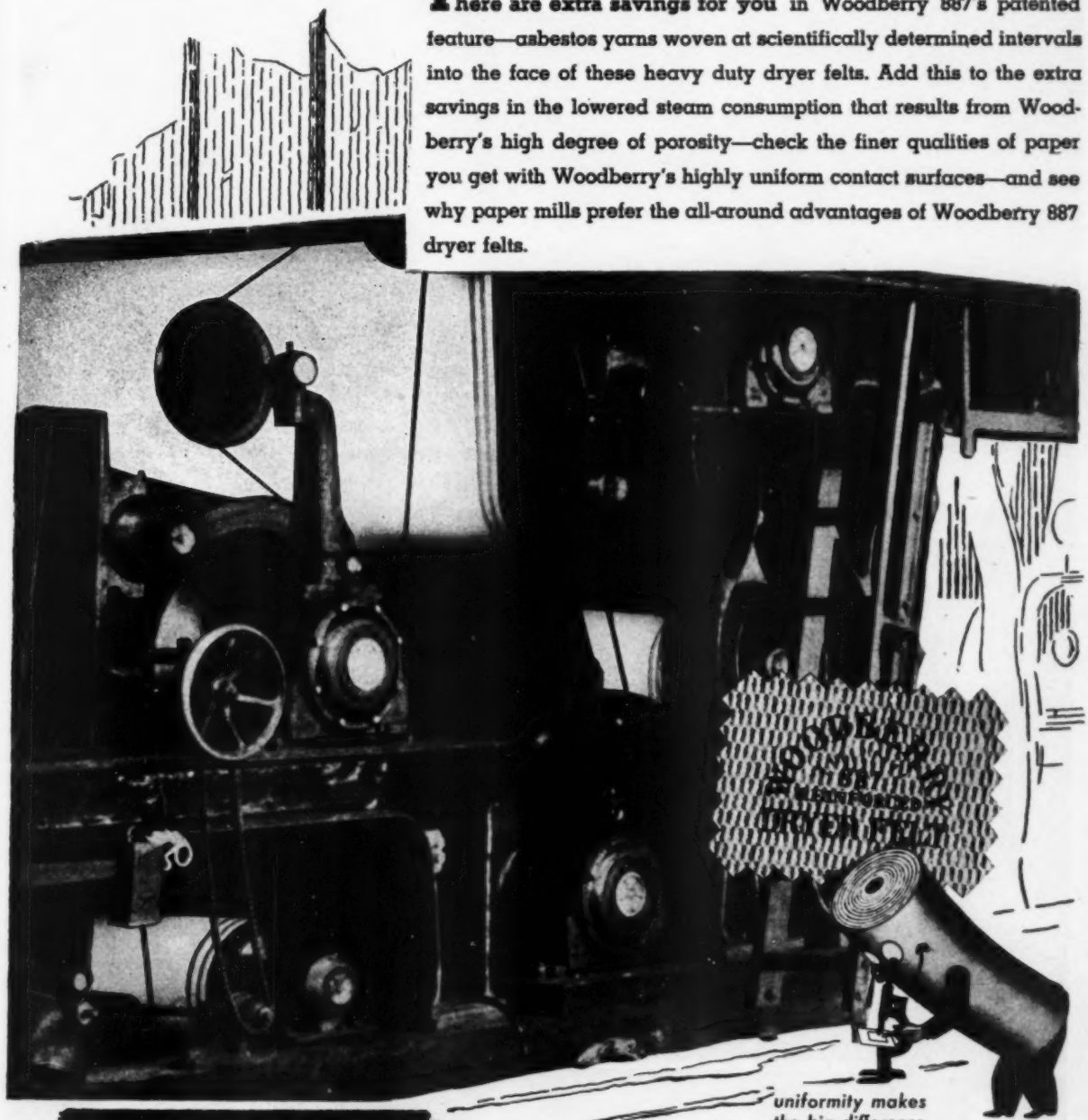
Savings are Higher With This Better Dryer Felt

There are extra savings for you in Woodberry 887's patented feature—asbestos yarns woven at scientifically determined intervals into the face of these heavy duty dryer felts. Add this to the extra savings in the lowered steam consumption that results from Woodberry's high degree of porosity—check the finer qualities of paper you get with Woodberry's highly uniform contact surfaces—and see why paper mills prefer the all-around advantages of Woodberry 887 dryer felts.



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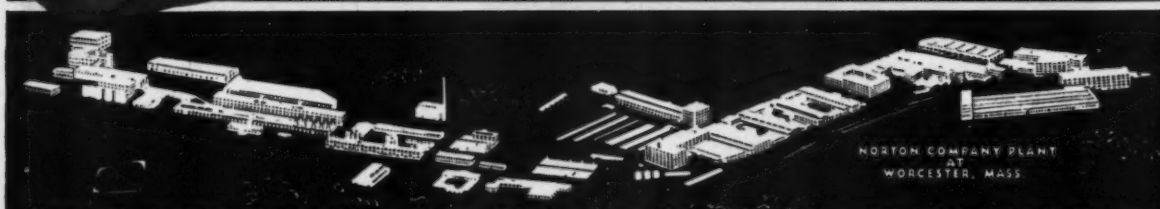
Real Engineering Service

To produce the type of pulp that you need from your type of wood, I recommend a 37C546-M7V stone. Also I suggest . . .

YES, that's what you get from your Norton pulpstone engineer — *really helpful engineering service.* He will study your particular pulp requirements, your type of wood and your equipment. From that he'll recommend a stone of just the right kind of abrasive, grit size, hardness and structure to meet your mill conditions. You'll also find that his years of experience in the pulp and paper industry will enable him to give you many helpful suggestions for producing pulp better or more economically. And he will be glad to assist with any other grinding wheel problems which you may have.

NORTON COMPANY, WORCESTER, MASS.
Norton Company of Canada, Ltd., Hamilton, Ont.

NORTON
PULPSTONES



Abrasives · Grinding Wheels · Grinding and Lapping Machines · Refractories · Porous Mediums · Non-slip Floors · Norbide Products · Labeling Machines

2,100 FEET PER MINUTE ON TIMKEN® BEARINGS AT TACOMA

Backbone of kraft production at the new St. Regis Paper Company mill, Tacoma, Washington, is a 180" Pusey & Jones fourdrinier designed to operate at 2,100 feet per minute, making it the world's fastest kraft machine.

To attain this speed the fourdrinier manufacturer knew friction could not be permitted. To maintain this speed they knew radial, thrust and combined loads constantly must be held in check and correct and constant roll alignment assured.

So following a policy established many years ago, Pusey & Jones have used Timken tapered roller bearings on the table rolls (60); lump-breaker roll (2); and breast roll (2). They also have equipped the reel cores with Timken bearings (8); and adjustable dryer felt-carrying rolls (16). Thus they have assured maximum operating speeds, minimum operating and maintenance costs with prolonged lives for wires and felts.

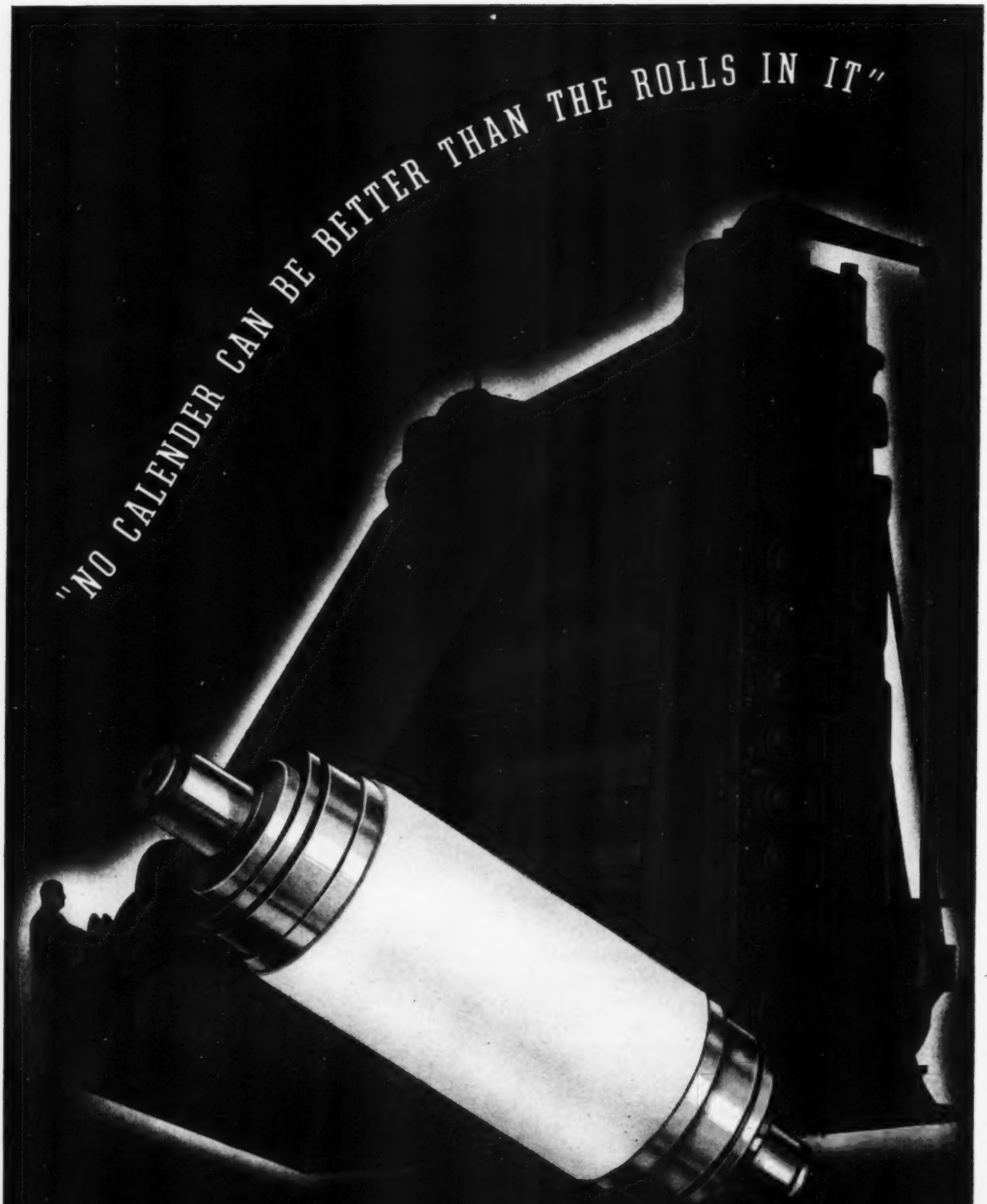
In addition to the above applications, the following equipment at the new St. Regis mill also uses Timken bearings: 110" and 153" Sumner chippers; Western Gear Company's right angle BH5 gear reduction units; Dilts 14-foot Hydrapulper; Dodge-Timken pillow blocks in splasher drives.

For more and better paper at lower cost specify Timken tapered roller bearings in the machines you build or buy. The Timken Roller Bearing Company, Canton 6, Ohio. Cable address "TIMROSCO".

TIMKEN
TAPERED ROLLER BEARINGS

NOT JUST A BALL ○ NOT JUST A ROLLER ⊂⊃ THE TIMKEN TAPERED ROLLER ⊂⊃ BEARING TAKES RADIAL AND THRUST →|← LOADS OR ANY COMBINATION

"NO CALENDER CAN BE BETTER THAN THE ROLLS IN IT"



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HOLYOKE, MASS.

LARGEST MANUFACTURERS OF CALENDER ROLLS IN THE WORLD

A NEW WAY TO CUT PULP WOOD AND PAPER HANDLING COSTS

SAW MILL — conversion plant — paper mill — the fast, truck-mounted Hydrocrane can help you increase your pulp wood and paper handling volume all along the line. Equipped with a 3-tine or forked hydraulic grapple, it handles big loads or single pieces of pulp wood safely, easily. The grapple has also demonstrated special ability for handling paper bales. It stacks bales close together by releasing them a short distance above the floor. Ordinary grapples cannot be released until after bale is set down — and space must be allowed for removal.

The fully hydraulic Hydrocrane is a "natural" for handling paper rolls. It has such accurate control that it places the most fragile loads surely and without damage. In addition to pulp and paper handling the Hydrocrane can be used for digging, trenching, lifting, hauling, clean-up work, snow removal and the like. Attachments include hydraulic clamshell bucket, trash bucket, magnet, grapple and hook.

33H49

Travels up to 50 m.p.h. on the open road — works in low ceiling buildings and in close quarters — simple to operate, hand levers only — smooth action — just some of the features that make the Hydrocrane a standout. Two models to choose from — ¼ yd. 2-ton H-2 and ⅜ yd. 3-ton H-3.

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South Milwaukee, Wisconsin

Gentlemen: I want the full story on the Hydrocrane.

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Company.....

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PIPE

Acid and Alkali Resistant

CARLON E FLEXIBLE PIPE for Paper and Pulp Mills

Two girls easily lift one 200 ft. coil of Carlon E Pipe weighing only 100 lbs. Easy to handle and install.

Solves Your Corrosion Problems

Carlon E Flexible Pipe is particularly suitable for paper and pulp mill applications because it will not rust, corrode or deteriorate in either acid or alkaline waters. It is impervious to practically all inorganic chemicals and completely free from any electrolytic corrosion—it cannot form a galvanic couple.

Thousands of feet of installations under strong sulphurous solutions have served for several years without replacements and with no evidence of corrosion or deterioration. These installations have proven that Carlon E Flexible Pipe is far more durable and practical than metal pipe subjected to the same conditions.

Carlon E Pipe like all plastic materials is not suitable in general for uses at temperatures in excess of 180°F. Chemical resistance, almost universal at temperatures to 120°F., decreases with temperature rise.

Carlon E Flexible Pipe is only one-seventh the weight of steel pipe and therefore is much easier to handle and install. Standard long length coils contribute to the handling and ease of installation, and are a major factor in its economy. Another saving is realized in the long length coils, since fewer fittings are required, resulting in the reduction of installation labor costs. Simple and efficient fittings in stainless steel or synthetic materials are provided at nominal cost for pipe to pipe connections and pipe to threaded connections.

PRICE—The price of Carlon E Flexible Pipe is comparable with steel pipe at normal prices. Carlon E Flexible Pipe installed is decidedly cheaper than the comparable size in steel pipe installed.

AVAILABILITY—Carlon E Flexible Pipe can be shipped within two weeks from receipt of the order and is furnished in long length coils in ½″, ¾″, 1″, 1¼″, 1½″, 2″, 3″. Four inch and 6″ diameters are furnished in 25 foot standard lengths.

Quantity, prices, and further information will be gladly furnished upon request.

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Speed PRODUCTION Reduce OPERATING COSTS

More and more leading paper mills are using Yarway Motor-Operated Digester Valves on the blow lines from pulp digesters to blow tanks.

Economy and speed of operation are two main reasons.

The famous Yarway *Seatless* principle assures a *tight* valve—effectively sealing off the digester, preventing loss of black liquor, increasing number of cooks per day. The simple push button motor control at top of digester means speed.

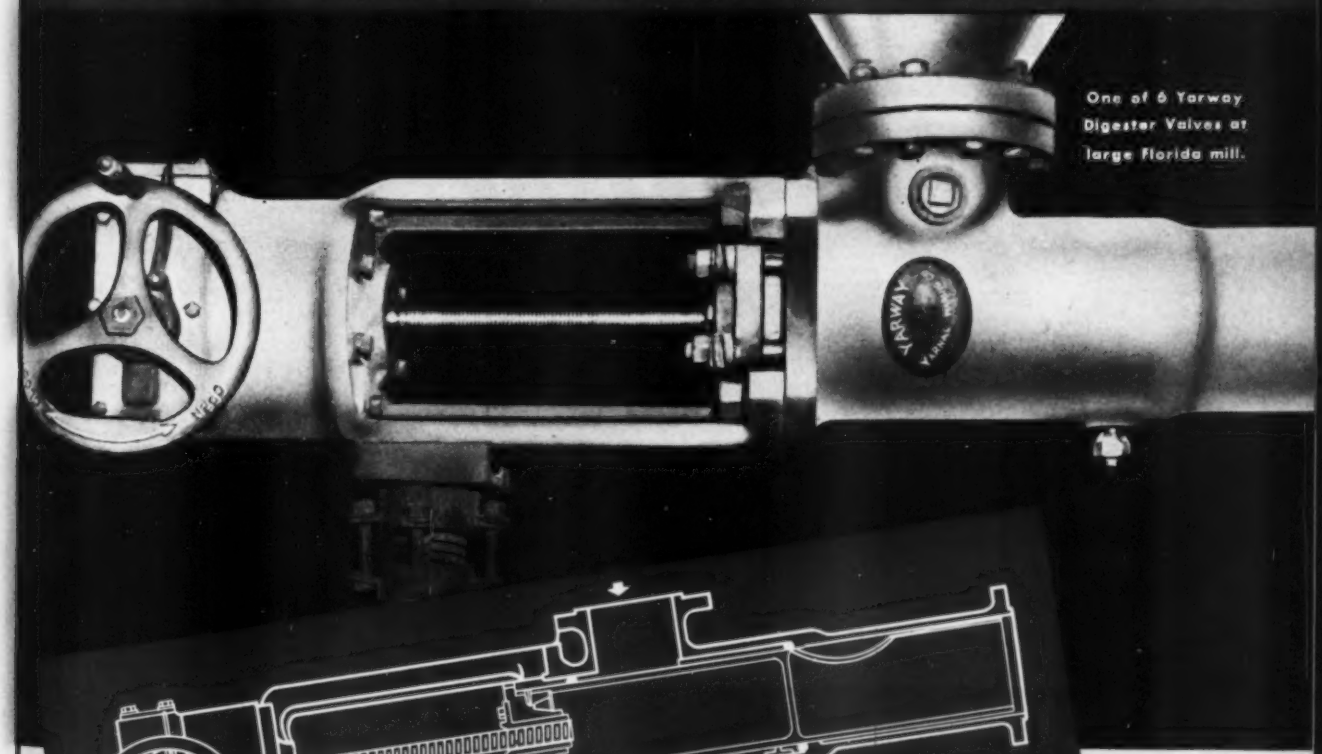
Metallurgical advancements also permit Yarway Digester Valves to withstand the pressure, shock and chemical action always encountered in this service.

In one mill, Yarways increased production 1½ to 2 cooks per day while reducing operating supervision. Another reports maintenance is lower than on any other type of valve for this service.

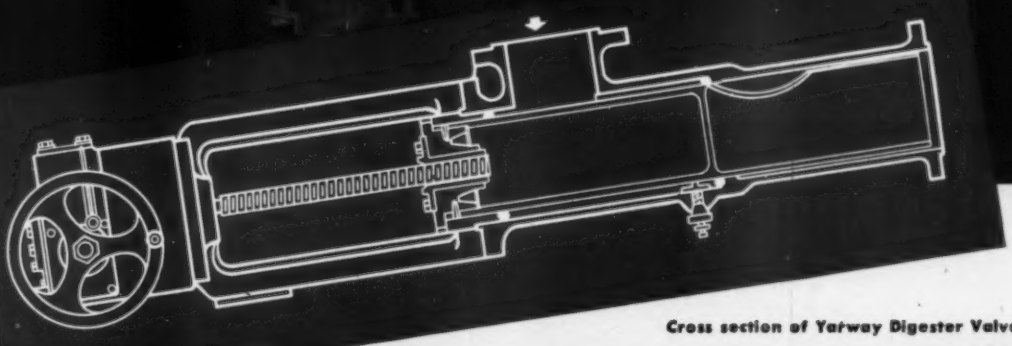
For more information on these valves, write . . .

YARNALL-WARING COMPANY
149 Mermaid Avenue, Philadelphia 18, Pa.

WITH YARWAY *SEATLESS* DIGESTER VALVES



One of 6 Yarway Digester Valves at large Florida mill.



Cross section of Yarway Digester Valve in closed position.

YARWAY BLOW-OFF VALVES

Appleton FELTS

MAKE GOOD PAPER ~~

TRADE MARK
REG. U. S.
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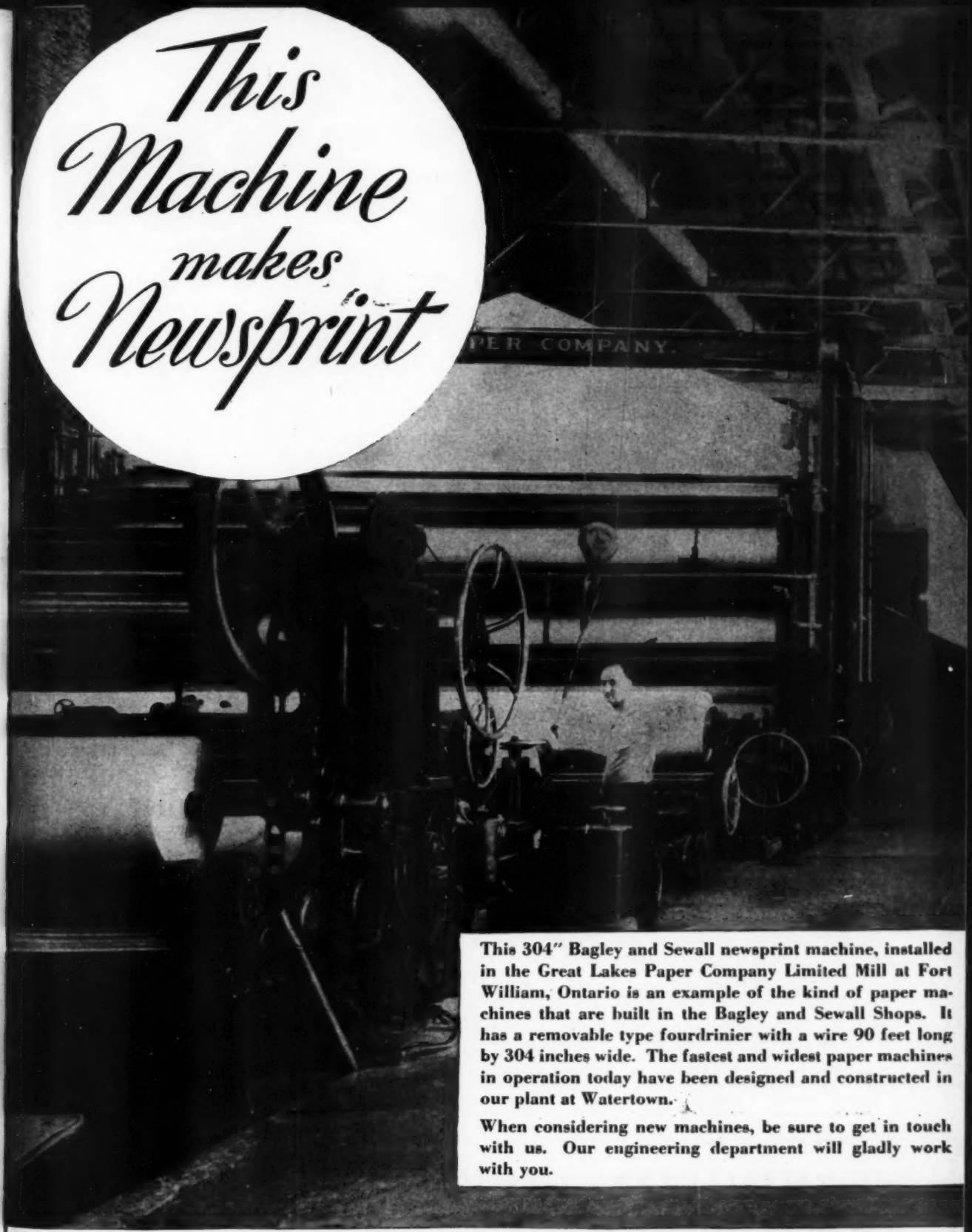
APPLETON WOOLEN MILLS

APPLETON · WISCONSIN



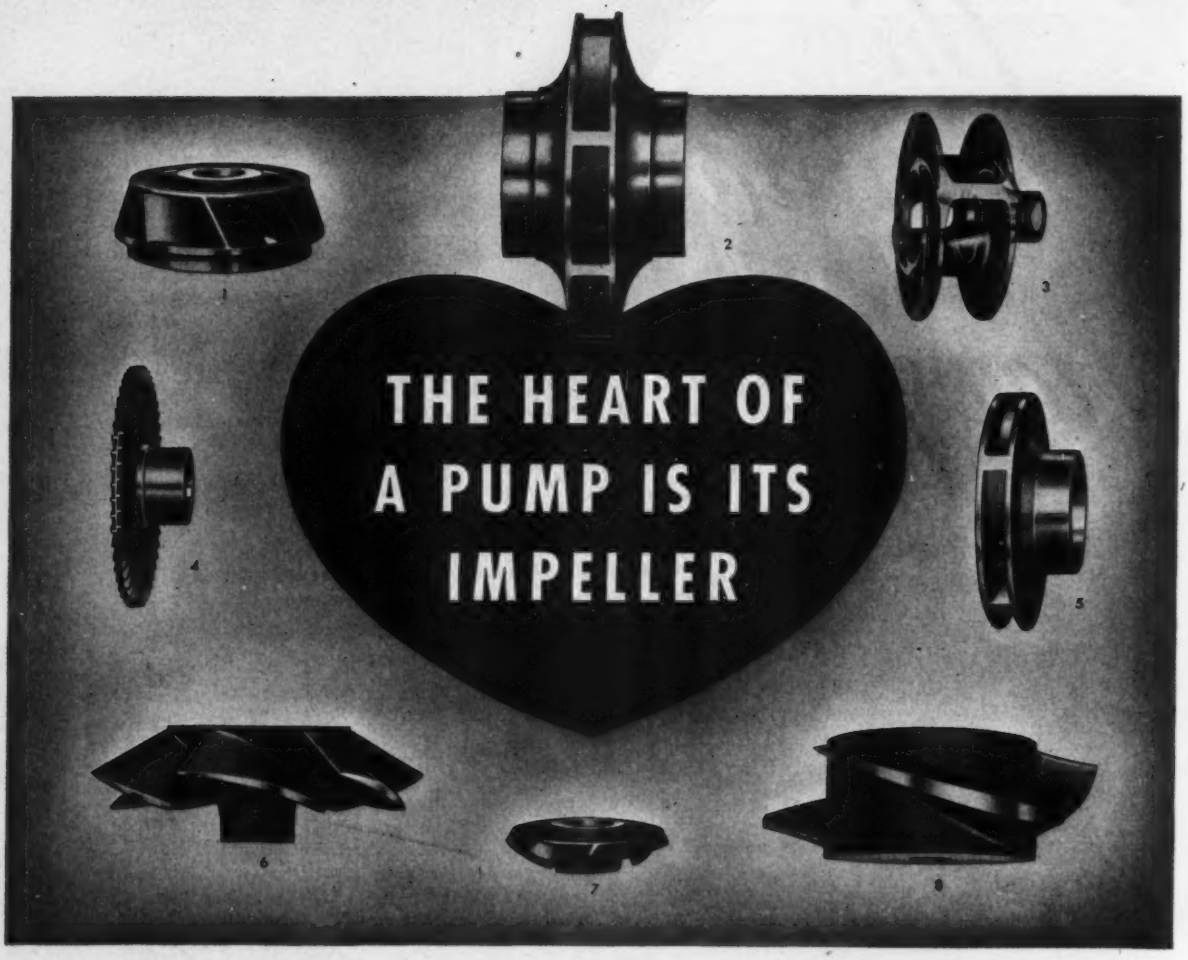
This 304" Bagley and Sewall newsprint machine, installed in the Great Lakes Paper Company Limited Mill at Fort William, Ontario is an example of the kind of paper machines that are built in the Bagley and Sewall Shops. It has a removable type fourdrinier with a wire 90 feet long by 304 inches wide. The fastest and widest paper machines in operation today have been designed and constructed in our plant at Watertown.

When considering new machines, be sure to get in touch with us. Our engineering department will gladly work with you.

BAGLEY & SEWALL

DESIGNERS AND BUILDERS OF PAPER MAKING MACHINERY

WATERTOWN, NEW YORK



Peerless Pumps utilize many different impeller designs to meet various fluid conditions

What makes a pump "tick?" Its heart is an impeller!

Pictured above are eight Peerless impeller designs for varying fluid conditions. No. 1 forces water upward from deep wells. No. 2 is a double suction design for high capacity horizontal pumps. No. 3 pumps solids in suspension. No. 4 handles all liquids in small capacities, at high heads. No. 5 is of single suction design for process services. No. 6 combines both radial and axial flow. No. 7 is a semi-open impeller for small diameter deep wells. No. 8 is an impeller that "propels" large liquid volumes.

The point is—capacities, lifts, heads, temperatures, chemical analysis, clarity, shaft speeds are seldom common to different pump services and installations. Because fluid conditions vary, Peerless pump designers are versatile and Peerless pumps utilize this versatility in different impellers for varying fluid conditions, successfully pumping most liquids in all industries.

Peerless horizontal pumps are available for general purpose pumping, for handling sewage and other materials in suspension, for most all process services, for moving chemicals and oils, for acids and caustics and for such specialized applications as l-p gases.

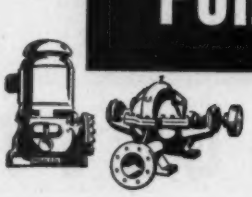
Peerless vertical turbine pumps are available for lifting water from deep wells or close-coupled for wet or dry pit installation and for drainage, drydock, canal diversion and flood control services.

Plan with Peerless for all your needs for pumps. Individual descriptive Bulletins on each of the types of Peerless Pumps described above are available upon request.

Peerless
VERTICAL AND HORIZONTAL
Pumps

fmc
PEERLESS PUMPS

PEERLESS PUMP DIVISION
FOOD MACHINERY AND CHEMICAL CORPORATION
Los Angeles 31, California — Indianapolis, Indiana
District Offices: New York 5, 37 Wall Street; Chicago 40, 4554 N. Broadway; *Atlanta Office:* Rutland Building, Decatur, Georgia; Omaha, Nebraska, 4330 Leavenworth Street; Dallas 1, Texas; Fresno, California; Los Angeles 31, California



3 sure Profit Makers

LIGHT WEIGHT ONE-MAN

One man can produce to the limit with this Disston One-Man Chain Saw for light felling, bucking, limbing and general needs. Light, easy and safe to handle. Starts sure. Powered to do tough work fast. Cuts at any angle, without adjustment. Proved features include instant, handy controls and automatic chain lubrication. 18", 24" and 30" Guide Rails are quickly interchangeable.

A few moments to saw this off

LIGHT WEIGHT TWO-MAN

Here's the Two-Man light weight saw everyone has been waiting for. Combines convenient two-man handling with minimum exertion in cutting bigger trees. New type Chisel Chain (with 30" Rail) makes large felling easy, even on hillsides. Remove handle and you have an efficient One-Man bucking bar. Available with 24" as well as 30" Guide Rail.

Get this done in a minute or less

EXTRA-DUTY TWO-MAN

The saw that handles the big ones right in stride. Full 12 h.p. Toughest ripping and cross-cutting are easy with new self-feeding Chisel Chain—automatically lubricated to save wear. 2' to 7' Guide Rails all quickly interchangeable anywhere. Bucking bar attachment available.

Handles big work easily

DISSTON CHAIN SAWS

with Mercury Gasoline Engines

•

for light work—
big cutting—
every purpose

PRICES
$399.50 up

BOW SAW ENDS PINCHING • SAVES TIME AND TROUBLE

"This is it!" for quick, easy bucking wherever trees fall, on any terrain. The sturdy, slim blade won't pinch in the cut. Saves stops and starts; saves time and money. This 15" Bow Saw with Disston One-Man Chain Saw power is a thrifty team. Bow Saw also available as an attachment, interchangeable with 18", 24" and 30" Straight Rails.

WHEN YOU BUY A DISSTON PRODUCT YOU BUY DISSTON STEEL SKILL and SERVICE

GET A DEMONSTRATION FROM YOUR NEAREST DISSTON DEALER AND GET A BRAND NEW IDEA OF WOOD-CUTTING ECONOMY

HENRY DISSTON & SONS, INC.
564 TACONY, PHILADELPHIA 35, PA., U. S. A.
Canadian Factory: 2-20 Fraser Ave., Toronto 3, Ont.

field engineering

Another good reason why
Appleton Wires
are Good Wires

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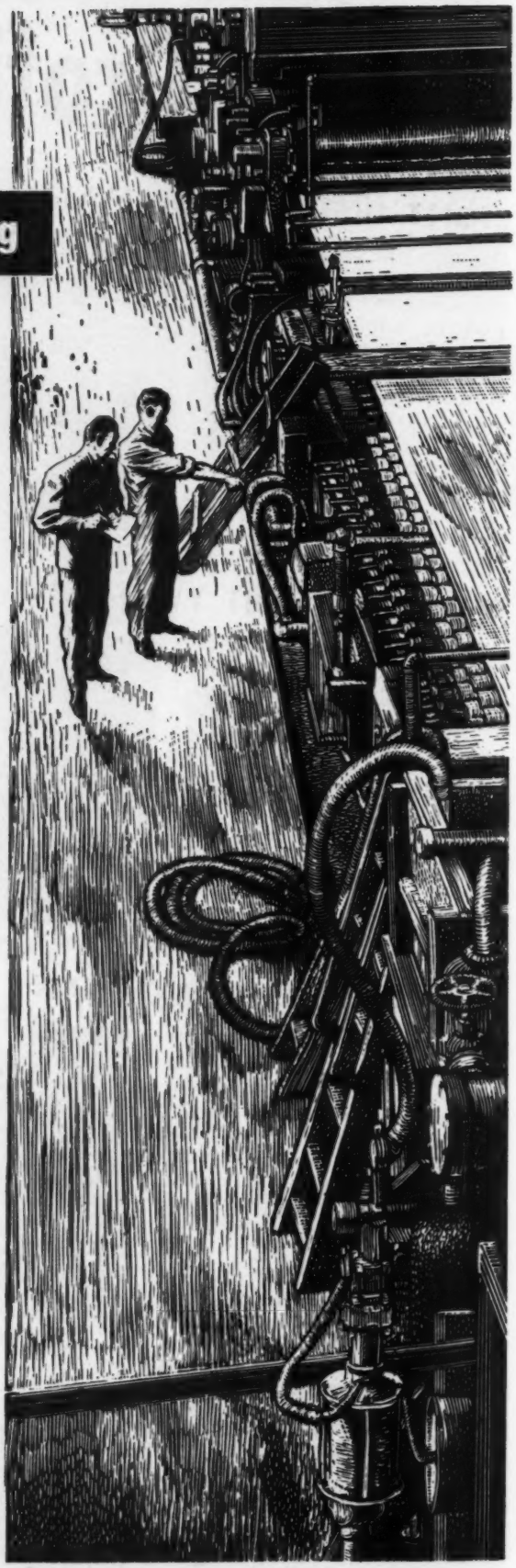
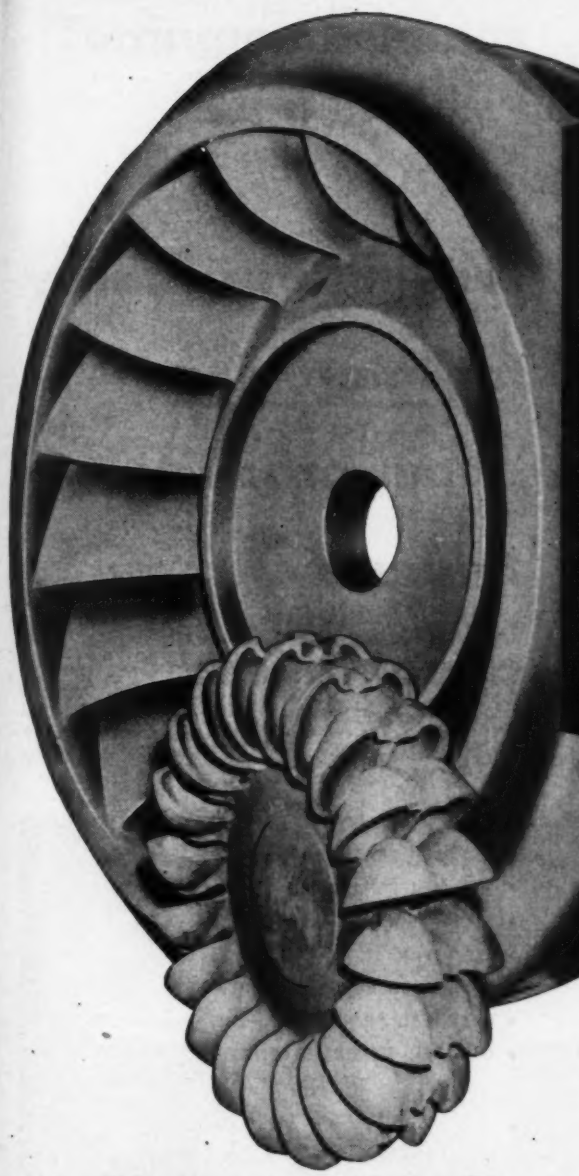
Appleton Wires are serviced in the field by experienced, qualified Sales Engineers.



APPLETON WIRE WORKS, INC.

APPLETON, WISCONSIN



WANTED!

MORE TOUGH JOBS for Chemalloy

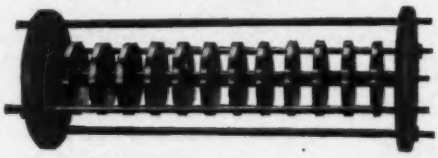
Cast stainless steel hydraulic turbine runners have to be right. The intricate shapes and thin metal sections make the job a tough one. What's more, surfaces must be clean—and the casting free from inclusions—to save machining time and costs. Add these to the corrosive elements encountered and you'll see why Chemalloy was chosen for these two jobs.

Chemalloy castings are uniformly clean . . . machine fast and easy with a good surface because quality is consistent—inside and out.

Where does Chemalloy get this uniformity? 1. Research, experience and skill in dealing with high alloy castings. 2. The combination of the correct corrosion resistant alloy and proper foundry technique. 3. Metallurgical control in each step of production. 4. X-ray inspection to doubly insure quality all the way through.

These runners are typical of the work being done by Electro-Alloys. They illustrate how Chemalloy is being used for the most intricate corrosion resistant castings.

Do you have a "tough" job? One that calls for corrosion resistance? Let one of our engineers explain how Chemalloy can help you. Write to Electro-Alloys Division, 2021 Taylor Street, Elyria, Ohio.



These Test Discs Solve Special Corrosion Problems. If studies of your alloy requirements do not supply sufficient information on which to base alloy recommendations, these test discs are put to work in your plant. Exposed to actual service conditions under which your castings will be used—they determine the correct alloy for your job.

SPECIFY **CHEMALLOY** FOR CORROSION RESISTANCE . . . **THERMALLOY** FOR HEAT AND ABRASION RESISTANCE

Mixer Arms • Filter Drums • Fittings • Dryer Parts

AMERICAN Brake Shoe COMPANY

ELECTRO-ALLOYS DIVISION
ELYRIA, OHIO

INDUSTRIAL GRADE OF SODIUM CMC

Proving its capacity for improving paper products, because of these advantages:

- RESISTANCE TO OIL PENETRATION
- REDUCED FEATHERING
- GREATER BRILLIANCY
- BETTER FOLDING PROPERTIES
- LESS WAX
- INCREASED BURSTING STRENGTH
- IMPROVED PRINTABILITY
- GREATER TENSILE STRENGTH

IT MAY pay you to investigate the application of ***Wyandotte Carbose I**** in certain phases of paper production. Carbose is a technical grade, low viscosity, sodium carboxymethylcellulose with a wide variety of uses in the Paper Industry. It can be added at the beater, squeeze rolls, size press, or calender stack of the machine or at a machine coater to impart various improved properties to liner, boxboard and a wide variety of papers.

To increase the bursting strength of jute liner, approximately 1½% solution of Carbose is added usually at the calender stack. Improved printability and better tensile and folding properties are also found.

A Carbose film is resistant to grease and oil penetration and therefore imparts a superior finish and gives reduced feathering and greater brilliance to glossy inks for all types of liner, boxboard and paper where such properties are desired.

Carbose is compatible with starches, polyvinyl alcohol, casein, wax emulsions, and most other paper chemicals.

Carbose offers many advantages in the manufacture of waxed paper, fiberboard, wallboard, and other pulp and paper products. It is useful in de-inking operations—and in clarifying white water by gelling fibers, fillers and pigments in the water.

You'll find this versatile chemical effective in performance and economical to use. For samples and additional information on the properties and applications of Wyandotte Carbose I, write the Development Department, Wyandotte Chemicals Corporation, Wyandotte, Michigan.

**Reg. U. S. Pat. Off.*

SODA ASH • CAUSTIC SODA
BICARBONATE OF SODA
CALCIUM CARBONATE • CALCIUM CHLORIDE
CHLORINE • HYDROGEN • DRY ICE
SYNTHETIC DETERGENTS • GLYCOLS
CARBOSE (Sodium CMC) • ETHYLENE DICHLORIDE
PROPYLENE DICHLORIDE • CHLOROETHERS
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OTHER ORGANIC AND INORGANIC CHEMICALS

Wyandotte Chemicals Corporation
Wyandotte, Mich. • *Offices in Principal Cities*

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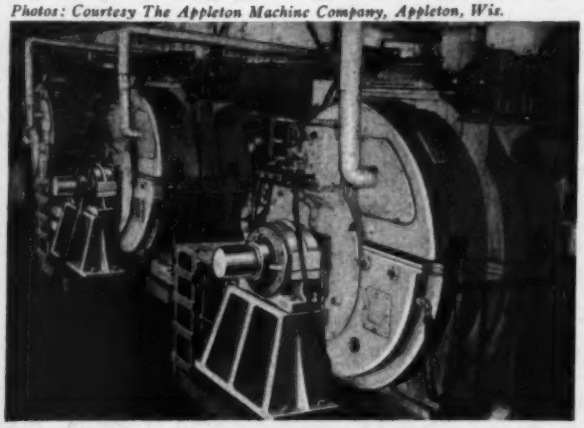
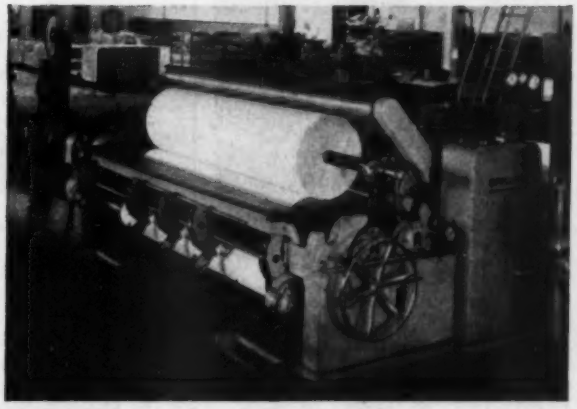
Torrington Bearings Set a Steady Pace of Production In Appleton Paper Mill Equipment

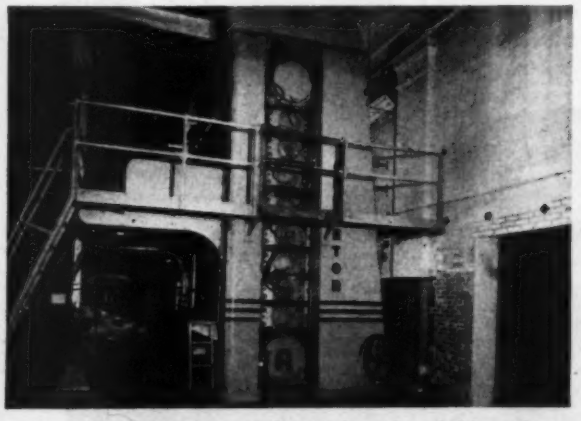
Photos: Courtesy The Appleton Machine Company, Appleton, Wis.



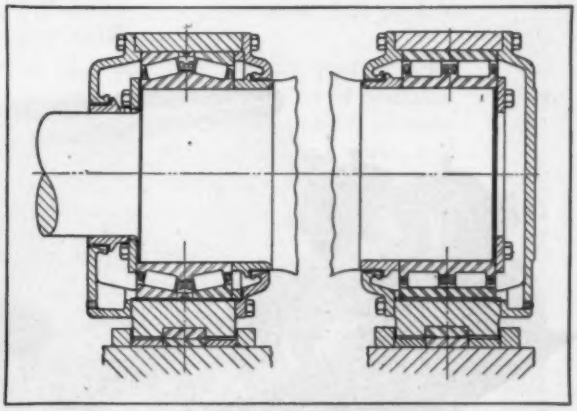
Continuous pulp production is an important feature of the Roberts Grinder. Appleton Machine Company uses Torrington Spherical Roller Bearings on the stone shaft for reliable performance at this 'round-the-clock pace. These bearings help grinders produce 50 tons of pulp a day.



Appleton Winder drum rolls are also equipped with Spherical Roller Bearings. Despite the 154" center distance between housings, accurate alignment is easy to secure. End play is eliminated. Drum rolls run free and true under heavy reels, and require a minimum of maintenance attention.



Appleton Supercalenders, too, benefit from the reliable performance of Torrington Bearings. On intermediate rolls, Spherical Roller Bearings permit rapid acceleration, eliminate roll crowding, web breakage and oil leakage. Production is speeded and paper caliper and finish improved.



This cross-section shows the design employed on Supercalender top and bottom rolls. A Torrington Tapered Roller Bearing at the rear accurately locates the roll axially. The front end "floats" through a Torrington Straight Roller Bearing, allowing free roll expansion and contraction.

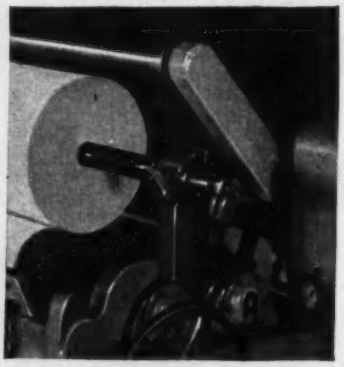
You can rely on equipment using Torrington Bearings to work to peak capacity, with minimum down time and low maintenance costs. Our engineers will gladly apply their experience with every major type of anti-friction bearing to your friction problems. Write us today. THE TORRINGTON COMPANY, South Bend 21, Ind., or Torrington, Conn. District offices and distributors in principal cities of United States and Canada.

TORRINGTON SPHERICAL ROLLER **BEARINGS**

Spherical Roller • Tapered Roller • Straight Roller

Needle • Ball • Needle Rollers

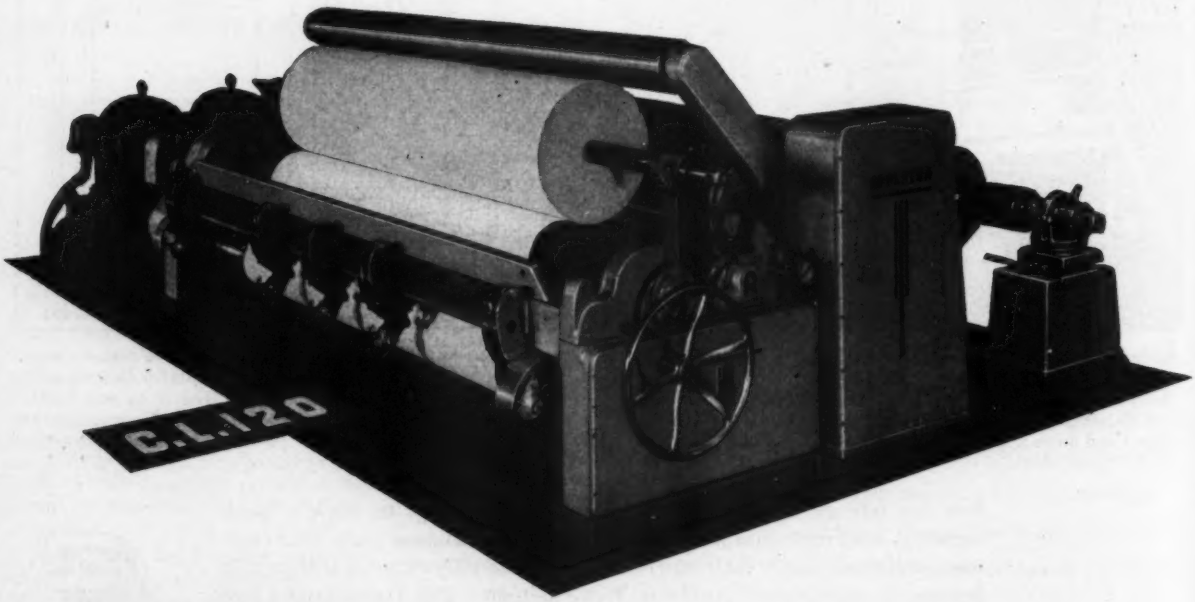
ALL OF THE FEATURES YOU'VE BEEN WANTING IN A WINDER AND SLITTER



NEW RIDING ROLL

The unique riding roll on Appleton Winders is carried on swinging arms, the fulcrum of which is so located that a high line of pressure is provided at the start of the wind and gradually decreased automatically as the weight of the roll increases. This feature aids in "tucking in" to give the desired hardness to the roll, to assure uniform density throughout and remove wrinkles.

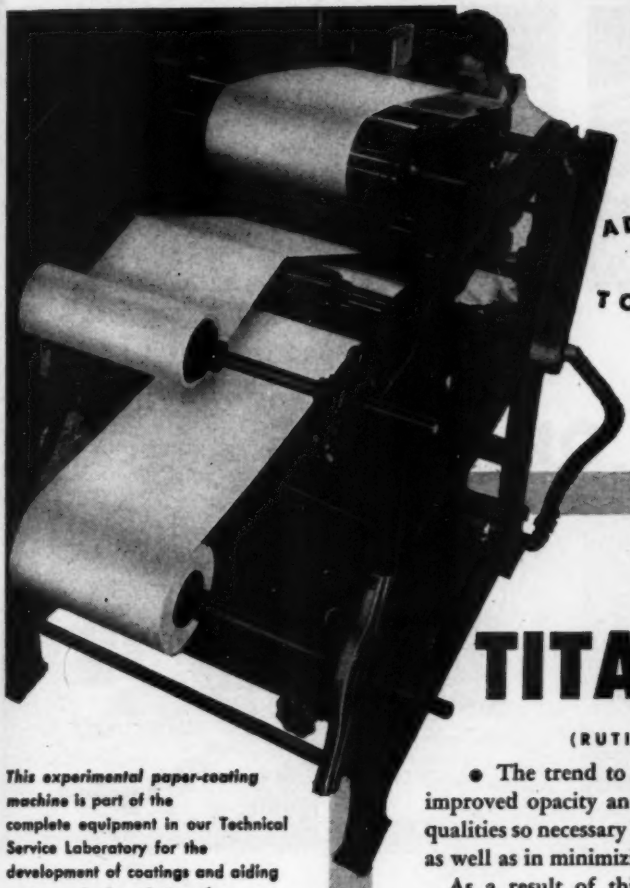
You'll find them all in the Appleton C-L Class Winders and Rewinders with Slitter mountings. Here is a list of some of the main features . . . A New Adjustable-speed Riding Roll with automatic pressure decrease, with hydraulic raising and lowering . . . Two Drum Type Winder with individual drives, variable speed, with special torque characteristics for each drum . . . Score-cut Slitting with pneumatic knife tension and release, lightweight demountable type holders with removable spindle, spherical type separators, safety guards . . . Electrically Controlled Web Tension . . . Adjustable Parent Roll Unwind, oscillating, selective . . . Adjustable Platen Roll Drive, removable sleeves . . . Roller Type Roll Ejector, hydraulically operated . . . Finger-tip Control, central control panel . . . Electric Eye Side Register Control optional . . . Speeds to 3500 feet per minute and more . . . Mill Type Winder, three sizes, 80", 120", 150" . . . Full information is given in the new Appleton Winder Bulletin. Write for your copy.



APPLETON WINDERS & REWINDERS

THE APPLETON MACHINE COMPANY • APPLETON • WISCONSIN

Eastern U. S. A. and Foreign Sales • CASTLE & OVERTON, Inc. • 630 Fifth Avenue, New York City



This experimental paper-coating machine is part of the complete equipment in our Technical Service Laboratory for the development of coatings and aiding customers in the solution of specific problems.

ADD HIGH OPACITY . . . BRIGHTNESS

TO MACHINE-COATED PAPERS

WITH

TITANOX-RCHT

(RUTILE-CALCIUM PIGMENT)

● The trend to less weight and thinner coatings calls for improved opacity and brightness. TITANOX-RCHT imparts these qualities so necessary in assuring clear printing and vivid pictures as well as in minimizing "show-through."

As a result of this high opacity at reduced pigment cost, TITANOX-RCHT has advantageously taken the place of titanium-barium pigment. And in many cases proves attractive in comparison with straight titanium dioxide TITANOX-A-WD. For example, from practical tests, the average weight ratios of these pigments for equal opacity and brightness are indicated as follows:

TITANOX-A-WD	1
TITANOX-RCHT	2.5
titanium-barium	3

Our Technical Service Laboratory staff will be glad to discuss with you the choice of titanium pigment to best suit your needs. Call or write our nearest office. Titanium Pigment Corporation, 111 Broadway, New York 6, N. Y.; 104 So. Michigan Ave., Chicago 3, Ill.; 2600 So. Eastern Ave., Los Angeles 22, Calif. Branches in all other principal cities.

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the brightest name in pigments

TITANIUM PIGMENT CORPORATION

Subsidiary of NATIONAL LEAD COMPANY

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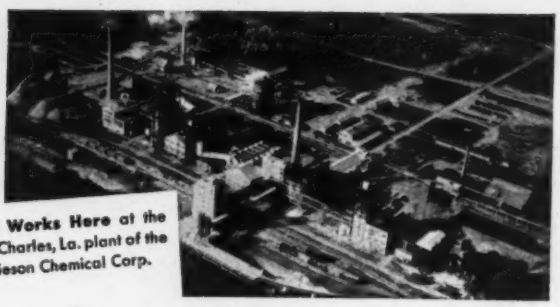
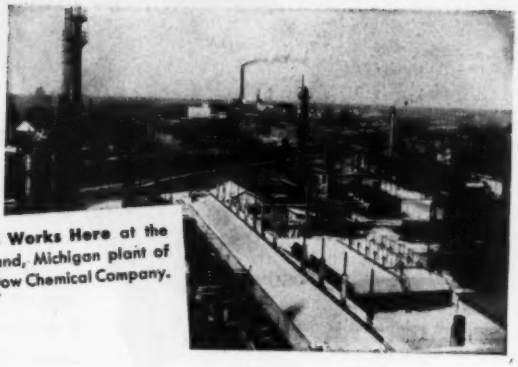


4+8 Works Here at the Lake Charles, La. plant of the Mathieson Chemical Corp.

4+8 Works Here at the Kodak Park plant of Eastman Kodak Co., Rochester, N.Y.

alkali OR FILMS

4+8 Works Here at the Chillicothe, Ohio Mill of the Mead Corporation.



4+8 Works Here at the Midland, Michigan plant of The Dow Chemical Company.

paper OR CHEMICALS

★ No matter what you process it will pay you to check into the Bailey simplified electronic control system.

With four basic circuits and eight basic component parts you can get more than 100,000 different electronic instrument and control combinations. Your problems of measuring and controlling flow, level, speed, pressure temperature, gas analysis, pH, conductivity, etc., can be solved by the right combinations of these 4 circuits and 8 basic parts.

You don't have to load up a stock room with parts. Bailey parts are interchangeable. What you used for the last combination is good for the next one when conditions in your plant change. You can save money, as others are doing, when you standardize on Bailey controls.

Bulletin No. 17 will show you how easy it is to install and use Bailey electronic controls. Write for your copy today.

you'll find Bailey Controls on the job

P-20

BAILEY METER CO.

1058 IVANHOE RD. • CLEVELAND 10, OHIO

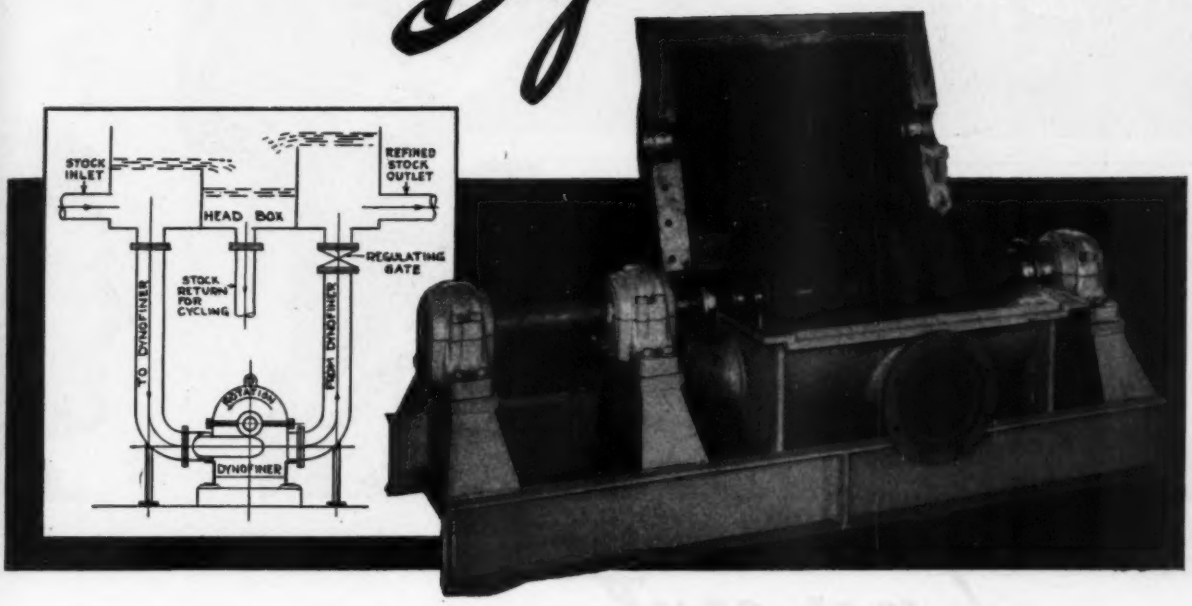
Bailey Meter Company Limited, Montreal, Canada

Controls for the Process Industries

TEMPERATURE • FLOW • PRESSURE

GAS ANALYSIS • LEVEL • RATIO

Here's the new DynoFiner



has no equal for continuous refining of paper stock

The efficient, continuous refining of pulp or waste paper is made possible with the DynoFiner through the use of a series of DynoPellers. These are concave discs. The concave sides are lined with numerous pieces of tungsten carbide. Centrifugal force causes the pulp to be sucked and thrown against the tungsten carbide pieces. This effective dynamizing action continuously refines the stock, the fibres being completely separated one from the other.

If you want to make better pulp from a given grade of stock and make it cheaper, write today for further information on DynoFiners, for continuous operation—DynoPulpers, for batch operation.

The DynoPeller

is the heart of all DynoMachines. Notice how its concave face is studded with sharp particles of extreme hardness. These small points efficiently separate the fibres without hydrating, cutting or slowing down the stock.

RICE BARTON Research Corporation

WORCESTER 1, MASS.

7 per cent IS NOT HAY...

"Remove as little as 2% more water at the wet end—and we automatically increase the efficiency of the driers by as much as 9%.

"Can we do it? Sure we can. Regrind the press rolls—adjust the bearings—install a new Hamilton Felt—apply plenty of squeeze.

"The Hamilton Felt will take out more than the necessary 2% extra water. It will increase the efficiency of your driers by more than 9%."

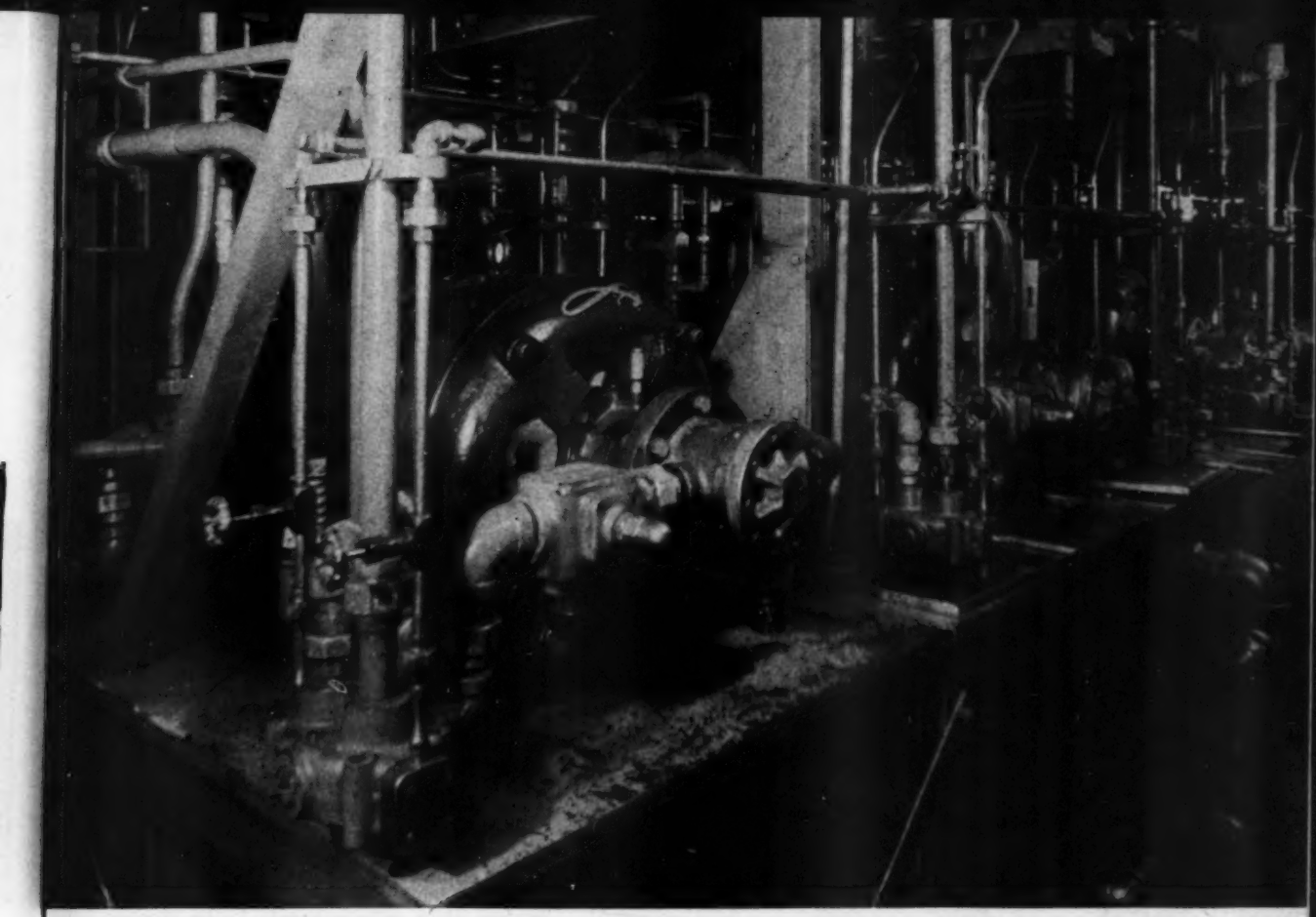
When a wet felt becomes clogged and "boardy" take it off. You will save time and money and do better work by replacing it with a new Hamilton.

SHULER & BENNINGHOFEN, HAMILTON, OHIO

• Miami Woolen Mills •

Hamilton Felts

• Established 1858 •



How to boost the efficiency of your hydraulics

STANOIL
Industrial Oil

A 3,000-gallon central hydraulic system, shown in part above, is used for the operation of 55 molding presses in a midwest manufacturing plant. In 1942, Stanoil 18 was introduced into this large system.

Tests of oil samples, made every six months, showed practically no deterioration of Stanoil. When the oil was changed, after more than 3 years' service, it showed a neutralization number of only 0.53. In the entire 6½ years of operation, make-up oil averaged no more than a barrel per month and there were no deposit or corrosion troubles.

These facts indicate the benefits you can gain by switching your hydraulics to Stanoil, but they by no means tell the full story. This unique, multi-purpose oil will provide clean, dependable lubrication in a wide variety of circulating systems. You can replace costly special oils and simplify stocking problems by using Stanoil throughout your plant. A Standard Oil Lubrication Engineer will be glad to help you.

Standard Oil Company (Indiana), 910 South Michigan Avenue, Chicago 80, Illinois.

STANDARD OIL COMPANY (INDIANA) STANDARD

Shown here is one view in the spotless modern plant where Swift's Animal Protein Colloid is made. Operation is continuous, automatic . . . the product is "untouched by human hands," not contaminated by foreign substances.

Investigate this Modern Process Agent:

Swift's Animal Protein Colloid*

(made from an exclusive Swift Process)

Does your manufacturing process require . . .

1. An emulsifier?
2. A flotation agent?
3. A gel structure?
4. A settling agent?
5. A protective coating?
6. A sizing agent?
7. A carrier of pigments?
8. An impregnating agent?
9. A base for pigment?
10. An oilproofing agent?
11. A flocculating agent?
12. A clarifying agent?
13. A filtering agent?
14. A stiffening agent?
15. A mordant?

This modern process agent, Swift's refined Animal Protein Colloid, has properties which may be employed in a wide number of processes. Even though you have used other processing agents, be sure you investigate Swift's Animal Protein Colloid now. It has unusual properties. It may meet the requirements of your present operations or help in developing new ones.

What is this modern process agent?

Swift's Animal Protein Colloid is made by an exclusive Swift process. Protein liquor is extracted from bones and highly concentrated. This pure liquid falls on a bed of dry finished product which adheres evenly to the droplets. Then, by continuous and automatic schedule, these droplets travel through driers and are milled and screened. This whole operation is under *precise synchronized control* and is completed in relatively short time.

The result is a uniform granular form that goes into solution rapidly. It's a purified product, light amber in color.

Because plant and machinery are kept spotlessly clean — the finished product does not touch material which can contaminate it with foreign substances . . . because of the precise control possible with Swift's exclusive process, Swift can bring you this *superior* processing agent. And Swift's Animal Protein Colloid has the same high quality and uniform characteristics the year 'round.

Swift's technical service yours, investigate now

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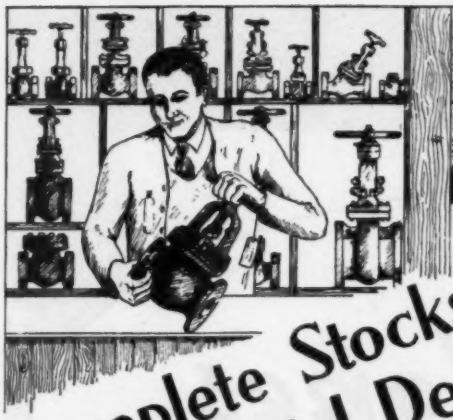

Complete Stocks of Standard Patterns + Special Designs for Special Services = the POWELL LINE

Powell presents a Complete Line of Standard Valves—in Bronze, Iron, Steel, Pure Metals and Special Alloys.* These are of every type and size, and for all pressures and temperatures encountered in the many services for which they are adapted.

But ever-changing methods and processes continually impose new flow control conditions. For these Special Services, Powell Engineers are always ready with Special Designs.

The result is that Powell—and only Powell—makes such a complete line that today there's a Powell Valve specifically adapted to each and every flow control service known to Industry.

Write for information on applications of Powell Valves. And if you have any flow control problems, Powell Engineers will help you solve them.

Fig. 1847 — 200-pound Stainless Steel Swing Check Valve. Screwed-in cap and regrindable, renewable disc.

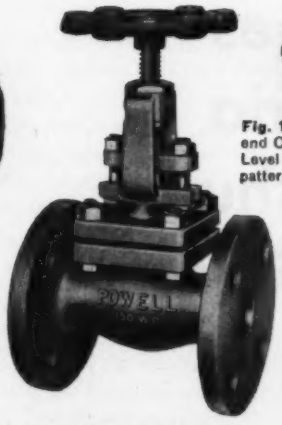

Fig. 1979 — 150-pound Stainless Steel O. S. & Y. Globe Valve with flanged ends.

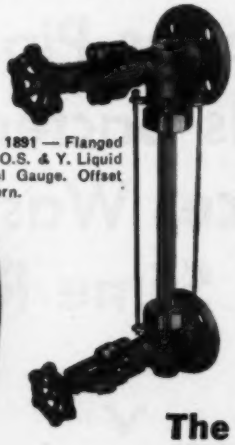

Fig. 1891 — Flanged end O.S. & Y. Liquid Level Gauge. Offset pattern.

Flush Bottom Tank Valve. Available in two designs: Fig. 2309—disc rises into tank to open; Fig. 2310—disc lowers into body.

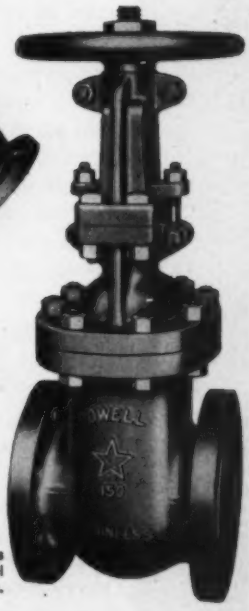

Fig. 1503 S. S. — Class 150-pound Stainless Steel O. S. & Y. Gate Valve.

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Editorial

Better Business Balance Ahead

▶▶▶ BOTH THE Department of Commerce and the Federal Reserve Bank are out with an analysis of the country's business.

The April issue of *Current Business* says: "Business and consumer buying in March continued at the cautious rate which has characterized recent months. The physical volume of consumer purchases in the first quarter was maintained at approximately the same level as the final quarter of 1948. The dollar amount of consumer expenditures was lower in line with the drop in prices, though higher than in the first quarter of 1948. From the peak of October, 1948, the major decline has been in farm and food commodities, and the industrial output, which had slackened in February, did not show the usual rise in March."

The slackening of output from the peak was induced by a drop in incoming business. This downward draft in new business has, in general, reflected a shortening of forward commitments, reduction of inventories and it also marks the lowering trend of new orders.

The flow of personal incomes was lower, but above last year for the same months. National income dropped in February to 217 billion. Most of the decline was in agricultural income. The February total was 5 per cent above that of February, 1948, and the same relative increase is expected for the first quarter as a whole.

Business is off from the peak rates of last year, but gross national product and personal incomes are considerably higher than a year ago. This is the boiled down substance of the Department of Commerce April review of business, covering a period of gradual recession for five months.

On April 27, came the report of the Federal Reserve Bank covering the same period as the Department of Commerce. In substance, it said: that "the decline in industrial production in March was greater than in any other month since the postwar high in October, 1948." The movement of the Federal Reserve Bank's Industrial Index Number for the period is given herewith because it is an interesting yardstick and is highly illuminating in connection with both the Department of Commerce and Federal Reserve reports:

The postwar high	195	for October, 1948
It declined to	194	for November, 1948
Then, followed with	192	for December, 1948
The first month of the new year	191	for January, 1949
It went down to	189	for February, 1949
And then, dropped to	184	for March, 1949

The drop of five points in March was more than in any of the previous four months. "The major cause of the March drop in industrial output, was the coal miners' memorial holiday which lasted about two weeks," comments the Bank. It is also worthy of note that the drop from the postwar peak of 195 was about 6 per cent, or an average slackening of a little over 1 per cent per month, which in turn, reflects the orderly course of the recession, and again reflects the immense volume of industrial activity throughout the country.

The Bank also observes that first squint at the preliminary figures for April shows that the output probably declined below the March figure of 184. As to the future course of the movement, no one can predict with certainty because of many factors liable to change as, for instance, the possibility of major strikes in coal, steel or auto industries, plus the disposition by Congress of the appropriation bills and demand by the Truman administration for more taxes to pay off election promises.

But, the business economy today is stronger and healthier than it was a year ago. The orderly lowering of cost and prices for postwar adjustment is taking place without disorder or panic.

Employment is still at high peaks at the highest wages in history. Incomes are 10 per cent higher net than a year ago and there is ample financial cushion to resist any fall.

At this writing, the welcome signs are appearing that Congress is rapidly becoming conscious that high taxes, extravagant spending, and inflationary schemes are against the interest of the public. It is certain now that the demand for a four-billion increase in income taxes is out the window. This is all to the good of the country and its business economy, for after all, the main cause for the deflationary trend from the peak of last October began in November following the national surprise election. It has continued to date due to a lack of confidence in the economic good faith of the new administration.

Business still has its fingers crossed. There will be no upturn of good stable business until confidence has been restored in the good faith of the administrators at Washington.

First World Conference

▶▶▶ THE FIRST international conference ever to be held on world pulp problems opened at the Windsor Hotel in Montreal, P.Q., on April 25 and continued through May 4.

The conference was called by the Food and Agricultural Organization of the United Nations. Delegates and observers representing some twenty-eight pulp-producing nations included executives from government and industry, along with forestry and forest products technicians. The nations represented account for from 90 to 95 per cent of pulp production.

Delegations were sent from Australia, Austria, Canada, Chile, Denmark, Finland, France, Greece, India, Italy, Netherlands, New Zealand, Norway, Sweden, Switzerland, The United Kingdom, and the United States of America.

Observers were sent from Argentina, Bolivia, Czechoslovakia, Ecuador, Guatemala, Haiti, and Turkey.

The United Nations Educational, Scientific, and Cultural Organization (UNESCO), which, at a meeting in Paris in 1948, expressed serious concern about the newsprint outlook and made a number of recommendations to FAO, also sent observers, as did the Supreme Command for the Allied Powers in Japan.

Canada Is Host

Canada was the host government. Delegates appointed by the Canadian government are: D. A. MacDonald, head of the Canadian Delegation, Dominion Forester, Department of Mines & Resources, Ottawa.

N. R. Chappell, Pulp and Paper Div., Department of Trade and Commerce, Ottawa

R. M. Fowler, president Canadian Pulp and Paper Association, Montreal

J. R. S. McLernon, director, Dryden Paper Company, Ltd., Montreal.

F. G. Robinson, president, Riordon Sales Corporation, Ltd., Montreal

Technical advisers and observers appointed by the Canadian government are:

T. A. McElhanney, Dr. A. Peebles, R. G. Ray, all of the Department of Mines and Resources, Ottawa

W. N. Murphy and G. H. Rochester, both of Department of Trade and Commerce, Ottawa

Prentice Bloedel, president Bloedel Stewart & Welch, Vancouver, B.C.

J. O. Chenevert, vice president, Consolidated Paper Sales Corporation, Montreal

H. S. Foley, president, Powell River Company, Ltd., Vancouver, B.C.

E. M. Little, president Anglo-Canadian Pulp & Paper Mills, Ltd., Quebec

C. M. Matheson, Fraser Companies, Limited, Montreal

F. L. Mitchell, W. H. O'Reilly, G. S. Pincott, all of Canadian Pulp and Paper Association

National statements from many of the 62 delegates and observers, working sessions, and committee meetings resulted in a general summary, that, for the first time, is based on world figures. Though a special statement stressed that "the forward estimates (which continue until 1955) are based upon varying hypothetical assumptions as to prevailing economic conditions in the various countries of the world," and though not all production or consumption figures are complete, the final draft, accepted in the Conference's final plenary session on May 4 gave a most valuable detailed report of facts, findings and recommendations.

Short Term Situation

"In 1948, world production of wood pulp reached an all-time high of about 28 million metric tons. At the same time, a number of new mills were under construction or in an advanced stage of planning in North America, Latin America, and Oceania. In Europe and Japan, efforts were being made to restore as far as possible prewar capacities of the pulp and paper industries. Toward the end of the year, however, the world market for pulp was beginning to show signs of at least temporary saturation, and this created some uncertainty among producers and consumers about the world situation and outlook for wood pulp." This quotation is from the report.

Prominent men who participated in the proceedings of the Preparatory Conference on Wood Pulp Problems were: (L to R) Dr. Egon Glesinger, secretary-general FAO; R. M. Fowler, (Canadian Pulp and Paper Association), Conference chairman; Norris E. Dodd, director-general, FAO; N. de Felsovanyi, assistant secretary-general, FAO

on Wood Pulp Problems

The continuing rise in requirements for pulp and its products repeatedly has induced the Economic and Social Council of the United Nations and UNESCO to stress the urgent necessity of providing more newsprint and other papers for the promotion of education and the distribution of news.

A message to this effect by the director-general of UNESCO, Torres Bodet, of Mexico, was read in open session in English and French by M.P. Desjardins. While consumer needs are vast, and enormous areas of the world are practically without supplies, the situation is complicated by currency and exchange problems, or outright lack of purchasing power in many countries. In UNESCO's eyes, in view of the needs of intellectual and social progress (with detailed statistics proving this need), current output is not considered sufficient, and there is a serious shortage which threatens to grow progressively worse in the coming years and decades, unless energetic steps are taken now to speed up the expansion of production.

While newsprint only takes up a percentage of pulp production, the short term survey continues, the recent changeover from a sellers' to a buyers' market was accompanied by price reductions for all grades of wood pulp.

Several major shifts in the world pattern of the wood pulp industry have taken place during the past decade, most of which are attributable to the war and its aftermath. Other changes are in prospect for technological reasons.

Most of the participating delegations provided the Conference with brief statements outlining the main features of the wood pulp situation in their respective countries. During its sessions the Conference assembled and discussed regional and world statistics relating to production, consumption, and trade in wood pulp and pulpwood. Special attention was paid to requirements for the immediate future, and statistical summaries were prepared showing the regional and total effects of present estimates of projected consumption and production of wood pulp and pulpwood up to the year 1955.

Because of the anticipated development in requirements for pulp and its products, special interest attached to the possibilities for finding new sources of raw material. For this reason the Conference established a special committee to consider the possibilities of using tropical woods for pulping, and also a committee on straw pulps.

TABLE 1—Preliminary World Pulp Balance* (in 1,000 metric tons)
Apparent surplus (+) or deficit (—)

Region	1937	1948	1949	1950	1955
Europe	+2,445	+1,200	+700	+290	—530
USSR	——	+ 40	+ 50	+ 75	+200
Near East	— 10	— 5	— 5	— 5	+ 5
North America	—1,105	— 210	—445	—490	—230
Latin America	— 220	— 280	—245	—255	—260
Africa	——	——	——	——	— 5
Asia	— 335	— 15	— 85	— 55	— 60
Oceania	— 50	— 45	— 50	— 80	— 90
World	+ 725	+ 635	— 80	—515	—970

(*) The forward estimates are based upon varying hypothetical assumptions as to prevailing economic conditions in the various countries of the world.

Findings of special Committees on. Tropical Woods Utilization and on Straw Pulp and Strawboard—As the possible use of alternative raw materials is of extreme interest to North America, a more detailed report on the committee findings, than contained in the general report seems to be warranted.

The committee on Tropical Woods Utilization reached the following summarized conclusion:

In view of the extremely heterogeneous character of tropical forests, the conversion into pulp seemed to offer unsurpassable difficulties so far, because it is a generally accepted opinion among papermakers all over the world that only homogeneous cookings are successful. This matter was not fully confirmed by the Australian representative, Sir Herbert Gepp, on the Working Committee, who related his experiences with 8 or 9 species of Eucalyptus, although he admitted that separate cookings would be preferred from a quality point of view, even in this case.

Entirely new light was thrown on this subject by the communication of the French Delegation (Africa section) who *demonstrated for the first time* that it is fully acceptable to cook together a variety (24) of highly divergent species of woods from virgin stands of tropical rain forest, according to the sulphate and soda processes, suitably modified. This was proved by laboratory tests as well as commercial runs of experimental lots of these woods, transported from the Ivory Coast to a French sulphate mill during the last year. These experiments have proved so successful that it has been decided to erect a pilot mill on the Ivory Coast which is expected to start operations in 1950. If these semi-industrial experiments prove successful, it is the intention that this pilot plant will be followed by several standard commercial mills in other French tropical regions.

The Netherland delegation concluded, on the other hand, that in those regions where for natural reasons natural homogeneous easily accessible pine forests are available, as in certain tropical countries, these may deserve preference.

The committee suggested recognition of the importance of the French experiments, which for the first time in history offer the possibility of opening up the immense regions of tropical broad leaf forests, previously not usable, to produce pulp from mixtures of wood from heterogeneous tropical forests. It also suggested similar investigations should be taken by other countries, and the results thus obtained

be reported to the FAO for distribution.

The straw pulp committee concluded that the use of straw as a substitute for wood for pulp fabrication has already given and may give in the future excellent results from the technical point of view. In view of pulpwood scarcity, the committee urged countries and governments to undertake research concerning the improvement of industrial methods for the conversion of straw, and especially in view of the high silicate content, the recuperating process which is of the utmost importance in using these methods on an economical basis.

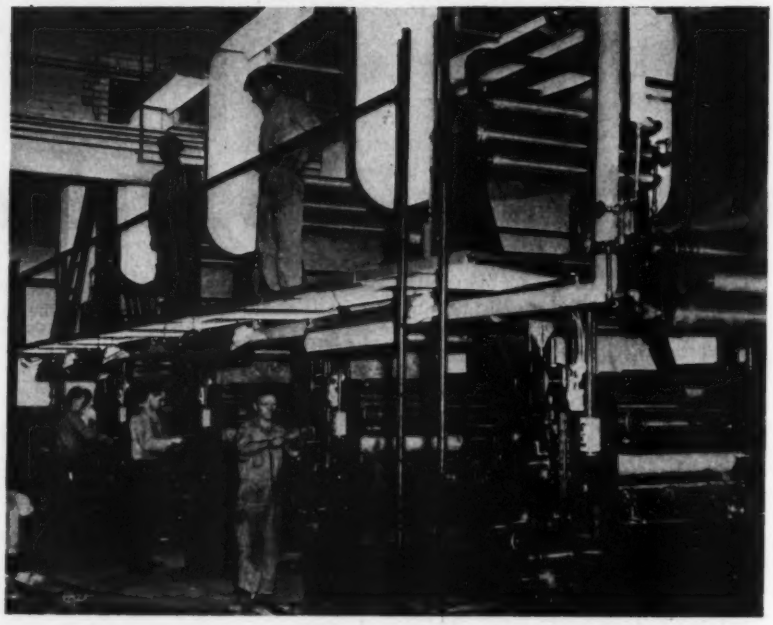
Conference recommendations conclude that FAO's program for wood pulp statistics be reviewed and that arrangements be made for the necessary exchange of information, also that FAO undertake special efforts towards the standardization of national pulp and pulpwood statistics in order to improve their international comparability.

In a general summary the Conference concluded that world needs for the products of pulp, newsprint, other printing and writing papers, wrappings, packaging material and textile fibers are far greater than existing supplies. The conference agreed in principle with this message from UNESCO. However, physical limitations as well as the economic and financial problems connected with the acquisition of desirable supplies were acknowledged to stand in the way of meeting consumer needs as disclosed by UNESCO.

The Conference estimates show approximate equilibrium between world production and requirements for 1948-1955. If these figures are confirmed by subsequent developments, there should be no major wood pulp surplus or deficit during this period.

Forecast for 1955

The increases for consumption and production of wood pulp and pulp products forecast for 1955 are subject to limitations, which particularly in Europe and Japan may place grave difficulties in the way of their fulfillment, the report stated. On the continent of Europe, though less in northern countries, forests have been heavily overcut during the war and postwar years, and these accelerated rates of cutting cannot be sustained indefinitely without disastrous results. As big demands are made for competitive forest products such as saw timber and pitprops, and as exports of pulpwood from the USSR have ceased, current estimates for European pulp production in 1955 would require net imports of pulpwood in excess of 3 million cubic meters.



New 4-color gravure press recently installed at Kalamazoo Vegetable Parchment Co., Parchment, Mich. Some of the maintenance men who shared in its installation are shown at work about the press

KVP ADDS NEW GIANT PRESS— A FOUR-COLOR GRAVURE

A new Robinson gravure press, recently installed in the Aniline-Gravure Print Department of Kalamazoo Vegetable Parchment Company, Parchment, Michigan, will increase the productivity and scope of gravure printing at KVP.

This modern four-color press will turn out a type of printing that will enable KVP to enter more markets than ever before in the printing field. Many sections and assemblies in this press were designed and made at the KVP plant.

The KVP engineering department and maintenance division worked for many weeks to remodel and install the press for the company's particular use. The new press incorporates many late ideas in modern printing. The electricians installed a battery of fluorescent lights which shed bright illumination on every section of the machine. After the press had been erected by the millwrights, the painters applied a glistening red to the frame and painted the under side of the catwalks white to reflect the maximum amount of light.

The new machine is an addition to the company's three other gravure presses: a 3-color HY-Roto, a 2-color Waldron, and the 1-color Gross.

A further factor affecting paper supplies is the increased manufacture of dissolving grades of pulp mainly for the production of textile fibers. Although this diversion affects only a small proportion of the total production of chemical pulp at present, it tends to reduce the amounts available for the production of paper and paperboard whenever it occurs without the corresponding expansion of pulp producing capacity.

Short Term Estimates

The world production in 1948 was some three million tons higher than in 1937, the best prewar year. Statistics assembled by the Conference indicate that this output was slightly in excess of current consumption. Although the apparent world surplus was less than three per cent of production and may be due to statistical inaccuracies, it tends to explain the recent decline in prices, accumulation of stocks and the difficulties encountered by producers in disposing of their pulp.

The estimates for 1949 and 1950 indicate a rapid restoration of equilibrium. World pulp requirements for 1949 are expected to exceed last year's consumption by 1.2 million tons, while world production will only increase by 500 thousand tons. For 1950 a further rise in requirements by 2,500,000 tons is anticipated which would exceed current production by 500,000 tons. If these forecasts are confirmed by subsequent events there might be even a slight deficit by the end of 1950.

North America's output in 1949,

for economic reasons, is expected to remain almost 600,000 tons below the previous year. This reduction would be offset by a projected increase in European production of 850,000 tons. In 1950 European production is expected to expand by another 600,000 tons and North American production by 1,300,000 tons.

North American market pulp requirements are estimated likely to continue on a somewhat higher level than production. It is possible that some of the resulting net import requirements may be met from accumulated stock, however. Allaying the fears of European producers, it is estimated that American purchases of European wood pulp are likely to be substantially larger than the quantities to be shipped from North America to continental Europe.

Long Term Outlook

It is estimated that 1955 pulp requirements will be roughly 10 million tons or almost 40 per cent higher than in 1948. This anticipated increase at an annual rate of almost 6 per cent is very substantial, especially when compared to an increase of only 3,300,000 tons or 15 per cent between 1937 and 1948, corresponding to an annual expansion of 1½ per cent. The forecasts for 1955 assume a period of peaceful expansion, whereas the past 11 years have been disturbed by a world war.

The Conference estimates show approximate equilibrium between world production and requirements for 1948 to 1955. If these figures are confirmed by subsequent developments, there should be no major wood pulp surplus or deficit during the period under review.

No current figures for Russia were available, it was stated, but an estimated export figure of 200,000 tons in 1955 was given for Russia, termed a "cautious estimate" and leaving open the possibility of a substantially larger forthcoming supply.

Expected Expansion of World Pulp Trade

Conference estimates indicate a gradual expansion of world pulp trade. In 1949 and 1950 it is anticipated that total exports will remain around 80 per cent of prewar, but they are expected to exceed the 1937 figures by some 10 per cent around 1955. Europe, it is estimated, would account for not quite 60 per cent of that, and the remaining 40 per cent would be contributed by North American exports. If this assumption proves right, it would mean that North American pulp exports would no longer be mainly confined to intra-continental movements.

Champion's Continued Expansion

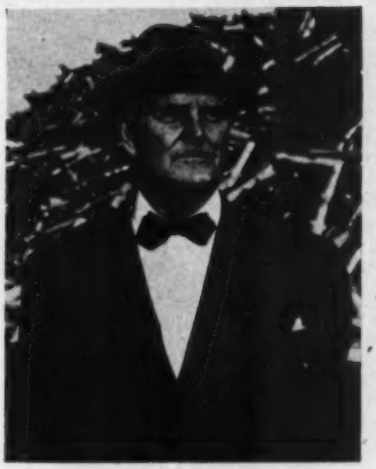
▶▶▶ IMPORTANT expansion of the capacity for making fine papers by the Houston Division of The Champion Paper and Fibre Company, with the addition of a multi-million dollar plant to serve the southwest area was announced by Reuben B. Robertson, president of the company.

The plant is in Pasadena, Texas, just east of Houston, and is adjacent to the company's mill which for ten years has manufactured highly bleached white pulp by the sulphate process from the forests of east Texas. The company's other manufacturing plants are at Hamilton, Ohio, and Canton, N.C.

Texas was selected by the Champion management as the site of its expansion because of the company's faith in the future of the growing southwest. The plant will be the first in the southwest equipped for complete conversion of the raw material of the forest into fine white paper, ready for the printer and converter.

"Ten years in the Lone Star State have given us unbounded optimism for Texas," said Mr. Robertson. "Furthermore, our engineers determined that in Texas alone could be found adequate water and wood supply, intelligent workers in sufficient numbers and easy access to markets."

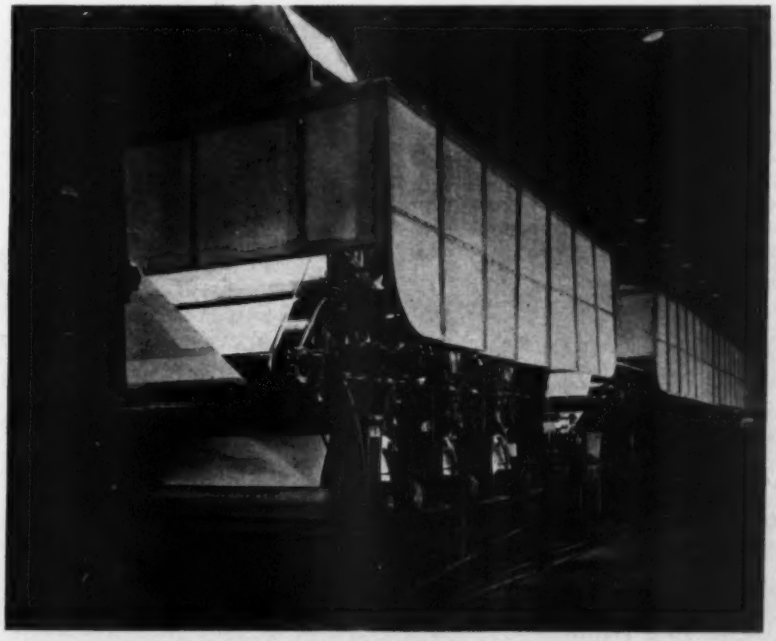
President Robertson recently presided at ceremonies attending the starting of operations of the new equipment—capable of large-scale production of various types of high grade papers.



R. B. Robertson, President
The Champion Paper and Fibre Co.

Because of the growing demands from the southwest area, Champion has planned ever since the war to make fine white paper in Texas. With the completion of the new plant and installation of its machinery, Champion now will make available to that area large quantities of fine paper made in Texas from Texas wood pulp.

This fact will mean special advantages to printers, advertisers and other customers. Integration of manufacturing operations will improve service, cut the time between orders and deliveries and reduce shipping costs.



Fourdrinier paper machine installed in plant of The Champion Paper and Fibre Co., Pasadena, Texas

New Coating Process

▶▶▶ A NEW method of coating paper was announced at the TAPPI Coating Conference held in Grand Rapids last month. Developed and patented by D. Robert Erickson, consultant, who formerly directed chemical research for Time, Inc. Laboratories in Kalamazoo, Michigan, this

D. Robert Erickson

new process utilizes well-known chemical principles that have never before been applied to paper coating.

Depending on precipitation of the coating by means of ion exchange rather than by impregnation of the fiber, this process provides a smooth, level surface that does not follow the contour of the rawstock and the coated sheet may thus be used without calendering. Advantages claimed for a sheet coated by this process are as follows: more compressibility, more flexibility, greater brightness, better opacity, greater affinity for ink, better adhesion of ink to the surface, better lay of ink on the surface, water insolubility and a sheet that can be readily standardized and duplicated. Actually, according to Mr. Erickson, ink will set up to 50 times as fast as on a normally coated and calendered sheet.

While the new process has not been used on a full-scale machine it has been thoroughly tested on a 10-inch web at high speeds (about 1000 fpm) in a small scale pilot operation. It has been successfully tried on many types of paper and board rawstocks with coat weights from 4 to 25 lb per ream (25 in x 38 in—500).

New Adhesive

The process utilizes a small quantity of hydroxy alkyl cellulose (a cellulose ether) as a binder or adhesive for the coating. This is precipitated immediately on application to the sheet by an ion exchange reaction. Hydroxy alkyl cellulose is now available in small quantities but will soon be manufactured on a large scale and will be available for commercial coating operations at a price competitive with present coating adhesives (on a basis of pound for pound of coated paper).

A new method for manufacturing this chemical has been developed and patented by Erickson. This process will substantially lower the cost of the material and will be available under license to bona fide users and manufacturers. At present, Erickson is setting up a small manufacturing plant to supply hydroxy alkyl cellulose to manufacturers who are interested in the new coating process.

The Old Way

To evaluate the new process it might first be well to review the mechanism by which coatings are presently applied.

When a normal type coating mix of water soluble binder, pigment and water is coated on a sheet of rawstock, whether the coating process be brush, air ductor, metal ductor, reverse roll, gravure or printing press type, the coating immediately upon application sinks down into the sheet *following the surface contour* of the wetted rawstock and allowing the fibers to stick up through the coating.

The water is absorbed into the paper and carries binder with it decreasing the amount of adhesive left on the surface to bind the clay particles. The sheet is then put into a drying oven or onto a drum dryer, which before evaporating the water, heats the water-adhesive mixture, lowers its viscosity and allows more of it to drain into the sheet. The result is a coated sheet, the surface of which is rougher than the original rawstock. Certainly, the higher the solids used and the higher the viscosity coating that can be used helps to prevent this process of impregnating the sheet with adhesive, but it is far from a continuous film overlying the fibers of the raw sheet.

If the rawstock has not been sized, the penetration of the coating is much faster, the swelling of the surface fibers is greater and the fibers lift up through the coating and can give a very rough surface. If the raw sheet has been highly sized we get less penetration of the coating, less raising of the surface fibers, but perhaps the disadvantage of poor coating application and poor adhesion of the coating to the stock. In either case, we have a coated sheet that may be suitable for offset lithography or aniline printing, but it is not suitable for letterpress. The surface contour must be level enough to allow the solids and the halftone dots on a nonresilient plate to print an ink at normal impression pressures over a high proportion of the entire surface of the sheet rather than over a small proportion of the surface. We must calender in order to get surface levelness or smoothness.

The New Process

The principle of the process lies in the fact that certain hydroxy alkyl ethers of cellulose are selectively soluble only in a critical concentration of aqueous sodium hydroxide and in no other solvents. These ethers are suitable as adhesive binders for clay and other pigments. They are linear polymers of high molecular weight, are capable of forming self-supporting inherently flexible films and have extremely high adhesive properties. They can, therefore, be used in very small amounts.

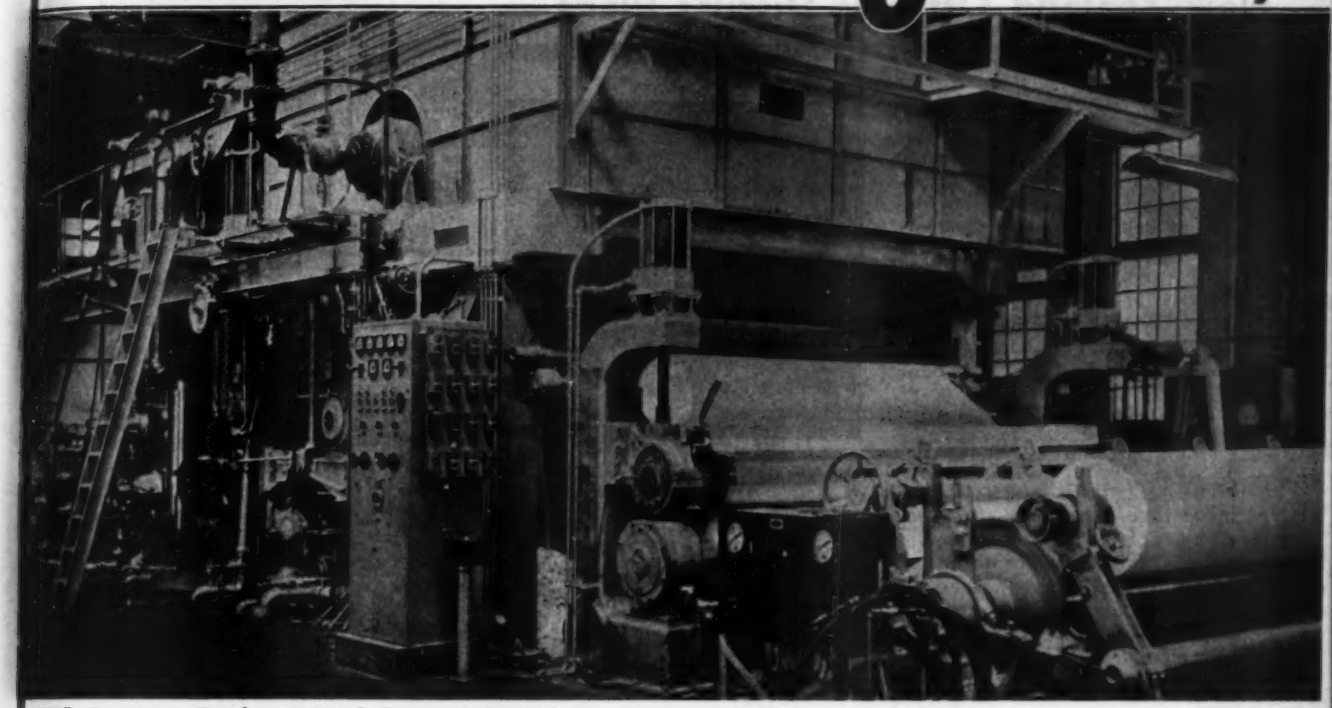
Because they are soluble in only one solvent, it can easily be seen that any unbalancing of this solvent equilibrium will precipitate the ether or binder from its solution. Therefore, it is possible, by either increasing the sodium hydroxide concentration, or by decreasing it or by exchanging the sodium ion of the sodium hydroxide for any other ion, to immedately change a fluid solution to a nontacky solid.

When a coating mix is made using such an adhesive for the binder, the formula would consist of clay or other pigment, dilute aqueous sodium hydroxide as the solvent and a small proportion of the hydroxy alkyl cellulose ether as the adhesive. Immediately after coating the rawstock with such a coating, by any suitable coating machine, the wet surface is contacted with a dampening roll or other suitable method of wetting, with a solution of a neutral or other salt that will simultaneously precipitate the HAC from solution by ion exchange, occluding the clay or other pigment in the smooth precipitated film and also neutralize the sodium hydroxide of the solvent and bring the *p*H of the coating to any desired end point.

The excess of the precipitating and neutralizing salt solution together with excess water of the original coating are removed by passing the sheet through squeeze or press rolls, such as are used on a size press. The caustic of the solvent does not harm the rawstock in any way as it is neutralized almost at the same time that it is applied. By ion interchange of the sodium ion of the sodium hydroxide for some other ion of the salt used to precipitate and

(Turn to page 186)

PAPER · · · America's 6th Industry



134" Puseyjones Fourdrinier Facial Tissue Machine at Groveton Papers Company, Groveton, New Hampshire. A duplicate of this machine installed at Rushmore Paper Mills, Inc., Natural Dam, New York.

GROVETON and RUSHMORE Build for the Future

Here is the latest Fourdrinier Facial Tissue Machine now in operation at Groveton Papers Company and Rushmore Paper Mills, Inc. Designed for maximum speed of 1500 F. P. M. Among the outstanding features are:

(1) Flow Spreader with new closed pressure slice;

(2) Automatically controlled air loading on upper couch roll, upper press roll, Yankee Dryer press roll, Calender stack, Reel, creping and cleaning doctors.

Whatever your papermaking problem, put it up to Puseyjones—for machines that give continuous, uniform production at high speeds.

THE PUSEY AND JONES CORPORATION
Established 1848. Builders of Paper-Making Machinery
Wilmington 99, Delaware, U.S.A.

New Zealand Officials Discuss Plans for Enlarged Paper Industry with Rust

▶▶▶ PLANS FOR A GREATER pulp and paper industry are being formulated in the Dominion of New Zealand. This information was given out by Clarence F. Skinner, Minister of Lands and Rehabilitation in the Dominion, while on a recent visit to The Rust Engineering Company's offices in Pittsburgh.

Accompanying Mr. Skinner during the two days spent in consultation with Rust were: A. R. Entrican, New Zealand Director of Forestry, and S. J. Robinson, Managing Director of B. J. Ball (N.Z.) Ltd., paper importers.

The scope and type of the projected papermaking facilities which are expected to have far-reaching effects on the economy of New Zealand were subjects of the conference. The discussion centered around technical and economic details of a comprehensive report on the suggested paper-mill program recently submitted after a survey by Rust.

Mr. Skinner, who is also a member of the New Zealand Parliament, said his government is contemplating an over-all program for utilization of its forests which may cost in the neighborhood of $100,000,000. The project, besides the paper mill, involves improvement of port facilities at Tauranga harbor on the North Island, some 40 miles of rail line to Murupara, 70 miles of power line, and building of a new town to serve the papermaking operations.

The Honorable Clarence F. Skinner, M. P. (left), New Zealand's Minister of Lands and Rehabilitation, confers with S. M. Rust, Jr., president of The Rust Engineering Co., on the Dominion's proposed paper industry development

The Dominion at present annually requires 27,000 to 30,000 tons of newsprint as well as other paper requirements. The new program would enable it to capitalize on its extensive pulp timber resources, similar to American southern pine, which were planted as part of a forestry rehabilitation program. Some 900,000 acres of this timber, planted since 1920, are now available.

The proposed paper mill, it is contemplated, would use a 234-inch, three-roll paper machine, with a maximum newsprint potential of about 60,000 tons of newsprint per year. However, present plans envisage production of about 50,000 tons of newsprint anually, with additional production of writing paper, groundwood and bleached sulphate pulp.

New Coating Process

(Continued from page 184)

neutralize, no acid is necessary for neutralization to cause excess acidity that would be deleterious to the rawstock.

Chemistry of the process is simple. When a salt such as ammonium sulphate is used as precipitator and neutralizer, the sodium ions of the aqueous hydroxide solvent for the cellulose ether binder exchange for the ammonium ions of the ammonium sulphate, immediately forming sodium sulphate and ammonium hydroxide. The binder is not soluble in ammonium hydroxide so is immediately precipitated to a non-tacky solid form. The ammonia of the ammonium hydroxide formed is volatilized leaving a substantially neutral film. If an acid salt is used as the precipitator, the reaction products are, of course, the added sodium to the salt used, and water. Combinations of acid salts can be used to give any *p*H desired in the finished film coating.

Other non-reacting substances may also be present in the precipitating bath that may impart various characteristics to the surface of the coated film without involving the cost of having to be dispersed throughout the entire coating. A choice of ionic charges can easily be imparted to the surface in this manner. Colloidal gels or sols can be applied to the coated surface in extremely thin films. Any of the commonly used pigments may be used in this process.

How It Is Used

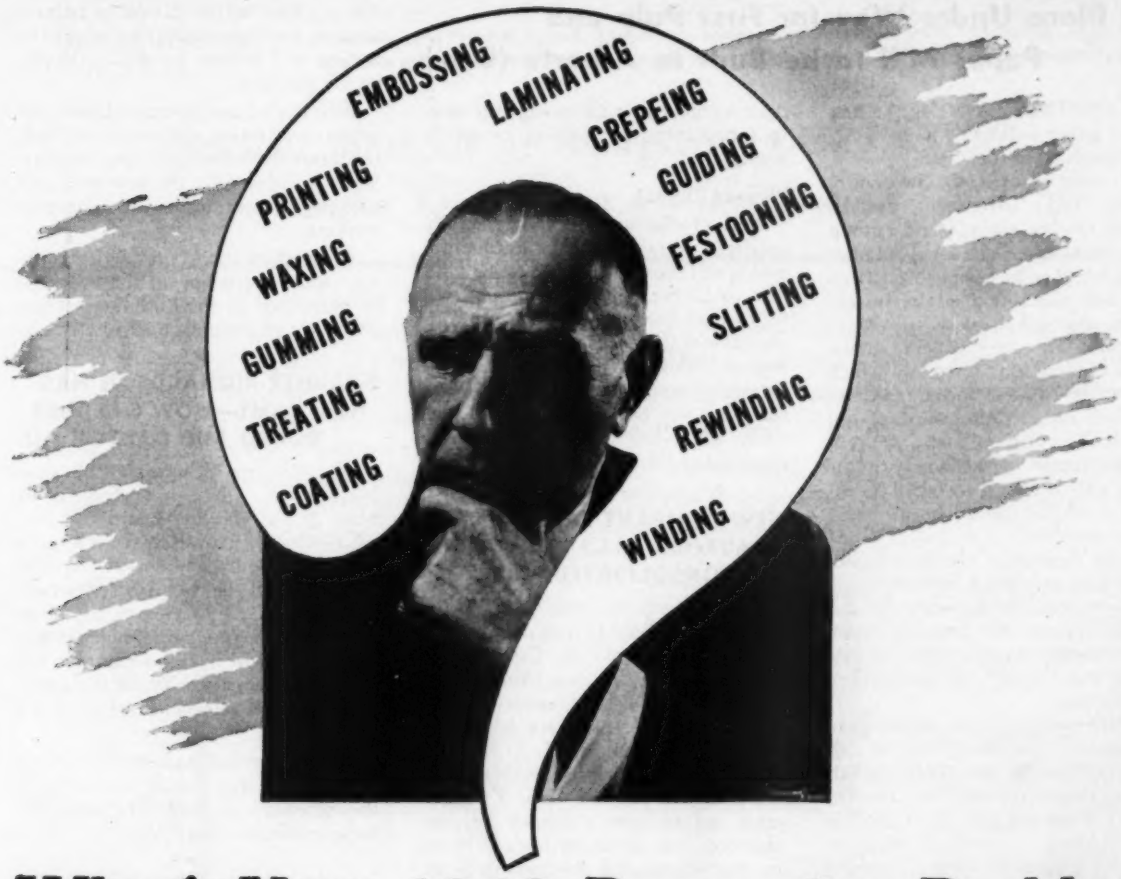
A typical simple coating color or formula is prepared as follows: 93 parts coating clay chemically dispersed in 40 parts water by addition of NaOH to a *p*H of approximately 10.25 to give a clay slip of 70 per cent solids; 2.5 parts NaOH in 14.5 parts N_2O to give a final 5 per cent NaOH content on total water; 7 parts alkali soluble hydroxy ethyl cellulose in 88 parts H_2O containing 5 parts NaOH, totalling 250 parts of a 40 per cent solids coating in a 5 per cent aqueous NaOH solution containing 7 per cent of binder board on the solids. This coating color is stable indefinitely and is completely resistant to bacterial growth.

The coating may be applied to the coating rawstock by any of the known methods, but preferably by a method that does not apply a pattern. Immediately after the coating is applied, it is contacted with an aqueous solution of a salt capable of ion exchange with the sodium hydroxide present in the coating.

Immediately following this contact, all excess setting solution and some of the water in the original coating is squeezed out by passing the sheet between two rollers, one of which has a somewhat resilient surface. A normal size press is very suitable for this operation. The sheet is then dried, preferably in contact with a drum dryer or a series of paper machine dryer rolls. This drying under tension is important to eliminate cockle from shrinkage. The finished dried sheet is level in surface contour to the extent that it does not have to be calendered.

Speed at which this method of coating can be used is entirely dependent on the mechanical capabilities of the coater and drying units. The time necessary for the ion exchange to take place is so short that it need not be taken into consideration on speed of coating.

The process is ideally suited for "on the machine" coating especially on machines that already include a size press. The press can be used for setting or precipitating the coating and squeezing out the excess water. An applicator roll and air ductor can be placed just ahead of the press rolls. The process is also ideally suited for simultaneous double side coating as no sticking is possible on the drying drums.



What's Your 1949 Processing Problem?

Perhaps it's the need for greater coating speed; a means for impregnating with a resin solution; how to combine two or more webs to provide greater protective quality to product; finding a way to change or splice rolls without stopping operations.

These are typical of the wide variety of processing problems being successfully solved for manufacturers and converters by WALDRON engineers—year in and year out.

The extensive line of WALDRON Processing Machines, each adaptable to particular operating problems and materials, provides the most dependable means for meeting your problem, increasing quantity and improving quality of output — giving your product greater salability. The industry's leading producers can testify to that fact. The WALDRON combination of long experience, sound engineering and machine building skill is responsible for most of the new major developments in the production of paper products during recent years.

Our Development Staff and Complete Testing Facilities Are At Your Service

Whether in connection with your present product or proposed future product and process — it will be well worth your while to consult us on the possibilities. Your inquiries will be welcomed and treated in confidence if desired.

JOHN WALDRON CORP.

Main Office & Works - NEW BRUNSWICK, NEW JERSEY

BUILDERS OF QUALITY MACHINES SINCE 1827

Final Plans Under Way for First Pulp and Paper Mill to be Built in Alberta (Can.)

▶▶▶ CONSTRUCTION OF the first pulp and paper mill to be built in Alberta, Canada, is to start soon.

R. O. Sweezey of R. O. Sweezey & Company, Ltd., investment dealers, Montreal, Quebec, Canada, and a group of associates have scheduled another meeting for May to complete financial details, but planning has already entered the practical stage.

Blueprints are currently being drawn up for a modern, one-story mill which is to contain two newsprint machines with a daily capacity of upwards of 200 tons each. The plans will take into consideration future expansion, with the original mill designed to facilitate additions as market conditions may suggest extension.

Definite decision of choice of building site will be subject to completing certain essential details with the Alberta government, Mr. Sweezey stated. So far Edmonton seems to be the best location, but Calgary has also proved very attractive.

A further delay is being experienced by protracted negotiations with the railroads about freight rates. Negotiations are being carried on with the Canadian National Railways and the Canadian Pacific Railway, as well as with the American railroads. Mr. Sweezey stressed the importance of the problem, as transportation difficulties have always hampered development of the Canadian middle west.

Transportation being a two-fold problem for a pulp and paper mill, with incoming freight of raw materials and outgoing tonnage of finished products, outcome of the negotiations with the railroads will be of foremost importance. Thought is also being given to possible trucking north-south, to points of loading on U. S. railways.

Natural Resources

Alberta forests offer mainly white spruce, black spruce, and jack pine, and these forests have never been tapped for pulpwood.

Water is available at both contemplated building sites. The needed purification will be carried out through a settlement box. Facilities planned for water purification will be ample, enabling the proposed new mill to supply other future industries with purified water.

Power and fuel requirements will be supplied from natural gas, a very desirable method, as a great deal of steam is needed for the process.

Local labor is plentiful as well as skilled, as the farmers of the province have through many years augmented their incomes by cutting logs for sawmill operations in logging camps in winter.

Planned Output

Mill production will utilize locally available saltcake to make kraft pulp, which will then be bleached at the mill. Ten to 12 per cent of the output will be used in the mill's newsprint, with the balance to be available for the open market. Daily capacity of the two newsprint machines to be installed in the plant will be upwards of 200 tons each, with American users currently negotiating for the entire output.

▼

NEW COMPANY TAKES OVER AURORA (ILL.) PLANT OF CONSOLIDATED PAPER CO.

A new company, incoporated as the Aurora Paper Board Company, has purchased the plant of Consolidated Paper Company, Aurora, Illinois. The main plant and headquarters of the Consolidated company are located at Monroe, Michigan.

The plant was closed on May 1. It is not known just how soon it will reopen as the new company has announced that extensive improvements in equipment and methods will be made.

Normally, this plant has employed about 135 workers—it was established in 1911. The purchase price has not been revealed, nor have the names of the new offices and directors been announced.

It is stated that the new plant will turn out products similar to those formerly manufactured. The capacity has been listed as 60 tons of fibreboard daily.

▼

BIRD & SON BUILDING FELT MILL AT SHREVEPORT

Construction of a new 50-ton per day felt mill is now under way at Shreveport, Louisiana, by Bird & Son, Inc., of East Walpole, Massachusetts. It will serve as an addition to the company's asphalt roofing plant there, and is expected to be completed in about twelve months.

The mill will contain approximately 35,000 sq ft of floor space. Practically all equipment will be new except the 169-inch wide felt machine, which will be dismantled and shipped from Wilmington, Delaware, and re-erected in the Shreveport mill. This machine is of sufficient size to allow for double the production contemplated at present, if future expansion should be undertaken. The machine will be driven by a steam turbine, and the exhaust steam from the turbine will be used for drying the felt on the machine.

Both skilled and common labor used in the construction of the new mill will be drawn from the local labor market. When in operation, the new mill will give employment to about 75 additional workers.

All work in connection with the design and construction of the mill will be performed by the Rust Engineering Company of Pittsburgh, Pennsylvania.

▼

GARDNER-RICHARDSON HAS NEW NAME—NOW GARDNER BOARD AND CARTON CO.

The Gardner-Richardson Company, Middletown, Ohio, has changed its name to The Gardner Board and Carton Company. However, the change is one of name only, and does not involve any change in the company's structure, its personnel, its policies, or any of its activities. The company announces that the change will have no effect on the rights and obligations under any agreements or arrangements to which it is a party.

The change was made to more nearly describe the true nature and scope of the company's business. The new name became effective April 25.

▼

TAXES DELAY DEVELOPMENT OF ALASKA PULP INDUSTRY

Although governmental agencies continue to advocate the extensive development of a pulp industry in Alaska, economic developments are tending to slow up the projects contemplated for the use of timber from the Tongass National Forest. Alaskan tax requirements are proving one of the handicaps.

A $16,000,000 R. F. C. Loan has been arranged by the Ketchikan Pulp and Paper Company, a subsidiary of American Viscose Company, and a timber contract has been signed; but while some construction work is going forward, the company is waiting for other aspects of the situation to be settled before becoming too deeply involved.

▼

▶▶▶ NOT YET three years old, Victor Wagner & Son, Inc., Buffalo, New York, paper box manufacturer, has launched its second big expansion program. The company will spend $70,000 for new building and machinery. A $125,000 expansion program was completed in 1947. The new program is expected to be finished by July 1, at which time employment will be boosted 10 per cent and manufacturing space expanded from 33,000 to 40,000 sq. ft.

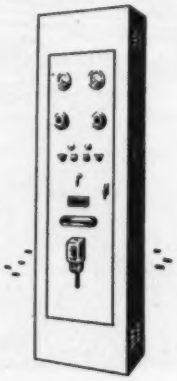
One of a Series

from Western Precipitation Corporation—pioneers of the commercial application of COTTRELLS *and now selling* COTTRELL *recovery equipment in all parts of the U.S.A. and foreign countries.*

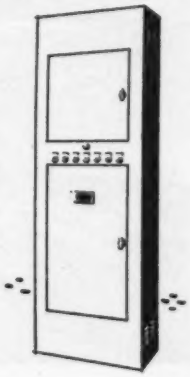
Various Methods of Energizing COTTRELLS *Make Experience a Vital Factor*

The many and varied factors affecting the operating efficiency of a COTTRELL Precipitator make experience and "know how" of the greatest importance in designing and installing COTTRELL equipment. Western Precipitation Corporation—*the organization that pioneered the commercial application of* COTTRELLS—has had over 39 years of first-hand experience in developing and perfecting the various elements that make up a complete COTTRELL installation, and these years of experience assure maximum performance from every Western Precipitation COTTRELL installation.

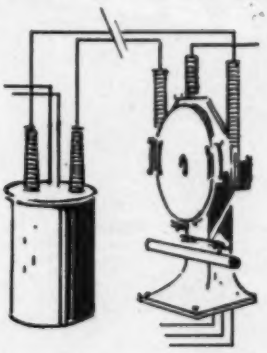
For example, the equipment for energizing Western Precipitation COTTRELLS include such features as the following...



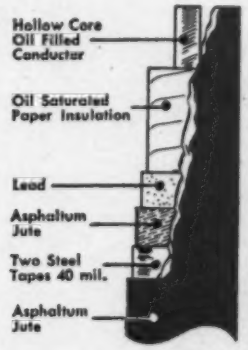
RECTIFIER SWITCHBOARDS—are of the Enclosed Cubicle type with flush-mounted meters, push buttons, selector switches, and indicating lights. The cabinet door and rectifier control circuit are interlocked. Rectifier and transformer contactors, instrument transformers, tap switches, terminal blocks and other auxiliaries are mounted inside the switchboard cabinet.



RAPPER AND POWER PANELS—are of the same external appearance as rectifier switchboards and can be installed beside rectifier switchboards to form a uniform and continuous switchboard installation. The cabinet is divided into two compartments—one containing AB breakers for control of all individual rectifier and signal circuits—the other containing all rapper controls and timers.



RECTIFIERS—for either full or half wave rectification. Mechanical rectifiers of the solid disc type are supplied with Radio Interference Correctors and Inductive Type Automatic Polarity devices. The Automatic polarity device has no commutator or brushes contacting high speed rotating parts. High voltage switch gear with interlocking control units is available.



HIGH VOLTAGE CONNECTIONS—between the rectifiers and the COTTRELL may be either special high voltage petrolatum-filled lead and steel-covered cable with pothead terminal connections, or of rod-and-bus-duct construction.

Watch for the next in this series which outlines the various* COTTRELL *electrode systems available from Western Precipitation Corporation.

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ENGINEERS, DESIGNERS & MANUFACTURERS OF EQUIPMENT FOR COLLECTION OF DISPERSED MATERIALS FROM GASES & LIQUIDS

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Western Precipitation can design COTTRELLS to operate at any desired efficiency, for any capacity, to collect virtually any solid or liquid suspended in a gas, whether hot or cold.

Do you have these helpful COTTRELL *booklets?* This literature answers many questions concerning COTTRELL equipment. Free copies will gladly be sent those interested. Ask for booklets C101 and C103.

EXPANSION PROGRESSING AT CROSSETT PAPER MILLS

The expansion program under way at Crossett Paper Mills, Crossett, Arkansas, is proceeding at an accelerated rate. The extension to the digester building, housing the three new digesters which have been in operation since November has had all exterior finishing completed and the scaffolding removed.

Steelwork for the new machine room is going up rapidly. This important phase of the long range expansion will be completed in time for Crossett's new 210-inch fourdrinier paper machine to be installed and in operation by the early part of 1950.

DONNACONA ACQUIRED BY HOWARD SMITH PAPER MILLS

A controlling interest in Donnacona Paper Company, Ltd., Quebec City, Quebec, Canada, has been acquired by Howard Smith Paper Mills, Ltd., Montreal, Quebec, President E. Howard Smith announced at the company's general annual meeting in Montreal.

During 1948, Howard Smith Paper Mills has purchased 150,250 common shares of Donnacona at an indicated cost of $3,437,949, including 37,750 shares purchased from Dominion Tar and Chemicals Company, Ltd., for $993,088 payable before January 5, 1950. Since the first of the year this investment has been increased by the purchase of additional shares, now giving the company "practically a controlling interst" in Donnacona, President Smith said.

▼

FORMER OWNER BUYS MILL OF WORTHY PAPER AT AUCTION

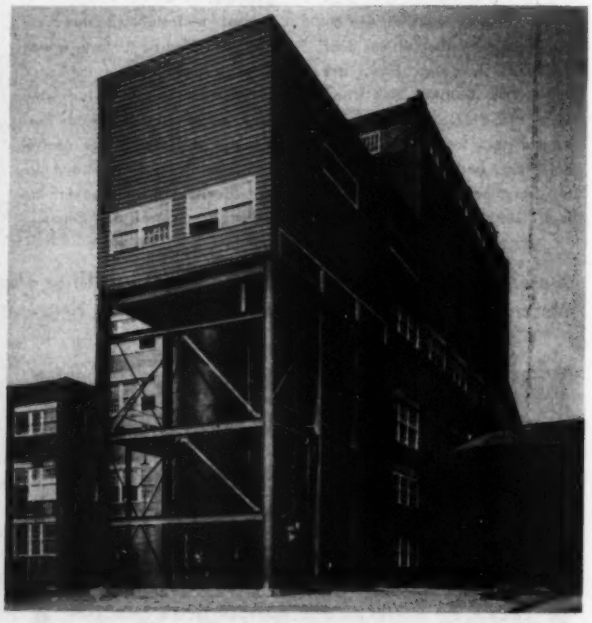
Its papermaking days over, the century-old mill of Worthy Paper Company, in Agawam, Massachusetts, was sold at auction April 12.

The mill buildings, steam plant and warehouse sold for $30,000—all purchased by Richard G. Ronaldson, of Longmeadow, Massachusetts, former owner of the mill. He states he plans to use one floor for a light manufacturing enterprise and will lease the

Steel work for new machine room which will house Crossett's 210-in fourdrinier machine

Extension to digester building—chip belt conveyor and tripper for charging digesters

Another view showing the charging floor of recently completed extension at Crossett



Exterior view of digester extension which houses the three new digesters

SELF-CONTAINED HIGH-DENSITY PUMP

NOTE: Ribbed side plates to keep rags and strings in dirty stock from clogging the pump —a special Shartle-Dilts feature.

The Shartle-Miami "HMS" is the only self-contained pump on the market capable of pumping up to 10% consistency stock—still higher densities in some cases.

The "HMS" employs two auxiliary impellers—a breaker impeller to encourage flow of stock to the suction of the pump and a booster impeller to force stock in pump to eye of the regular impeller. Ribbed side plates to stop clogging due to strings and rags in dirty stock.

In other words, the Shartle-Miami Class "HMS" is positively a single self-contained assembly. No extra equipment. No second motor. No purchase of two machines to do the work of one.

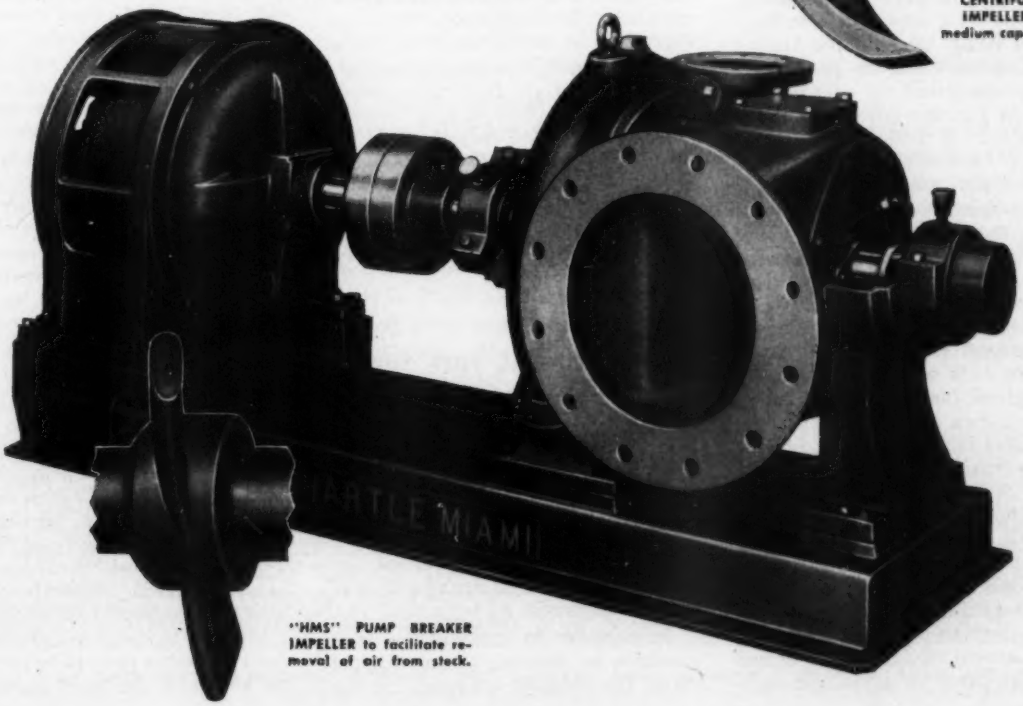
"HMS" PUMP IMPELLER for long-fibered stock.

"HMS" CENTRIFUGAL IMPELLER for medium capacities.

SHARTLE BROS. MACHINE CO., Middletown, Ohio
DILTS MACHINE WORKS, Fulton, New York

B-C INTERNATIONAL, LTD., 16 Catherine Place, Victoria, London S-W-1, England
DIVISIONS OF THE BLACK-CLAWSON COMPANY, HAMILTON, OHIO • Western Sales Office: Mayer Bldg., Portland, Oregon • Associate: ALEXANDER FLECK LIMITED, Ottawa, Canada

SOME 250 IMPELLER DESIGNS FROM WHICH TO CHOOSE THE ONE BEST SUITED TO PIPE LINES AND TYPE OF STOCK.



"HMS" PUMP BREAKER IMPELLER to facilitate removal of air from stock.

remainder of the space for manufacturing or storage.

The machinery in the mill was auctioned off for $30,000 additional to the price paid for the mill. A bid of $50,000 for the mill and equipment was turned down.

▼

▶▶▶ NINETY-NINE employees of the Cathlamet, Washington, logging division of the Crown Zellerbach Corporation received service awards at a recent dinner at the camp cookhouse. Forty-five year pins were presented to three men. W. D. Welsh of San Francisco was master of ceremonies; L. N. Rees, superintendent of the logging division, gave the welcome; D. S. Denman, vice president of C-Z from Seattle, was the speaker of the evening; and E. P. Stamm, logging manager of C-Z from Portland, presented the pins.

▼

▶▶▶ A MODERN WINDOWLESS 6-story building which will be used principally as a warehouse is now under construction at the Lakeview mill of Kimberly-Clark Corporation, Neenah, Wisconsin. Most of the storage space will be used for creped wadding, although some ground floor space will be used for storing raw materials. It is expected the building will be ready for use by the end of this year.

▼

IMPORT NOTES

▶▶▶ Constantly increasing quantities of paper napkins, serviettes and similar articles are being imported from England and being taken to the United States Customs Court on protests by the importers against the rates of duty assessed by Customs officials. According to Warren B. Bullock, manager of the Import Committee of the American Paper Industry, most of the napkins are being classified for duty at 35 per cent as manufacturers of paper, but claimed by the importers to be dutiable as paper cut into shape at 15 per cent. The napkins are of different types, some creped, others decorated with floral designs, still others embossed. While the bulk of the shipments are from England, Norway is also shipping some specialties, and a shipment printed in colors in the American zone of Germany has been received at New York.

An importer of a so-called tabulating card stock claims the material is dutiable as paperboard, but the Customs officials believe it is a vat-lined board, one surface being of a different character from the base.

The Customs officials have classified a Canadian paper for use in cash registers as a writing paper because of its finish and furnish, despite the claim of the importer to the lower rate of duty for printing paper.

Seven shipments of Finnish kraft wrapping paper have been held by the officials at Philadelphia to have been undervalued by the omission from the declared value of the Finnish inland freight from the mill to seaboard.

▼

NORWEGIAN GROUP STUDY PULP & PAPER PRODUCTION IN U.S.—APPROVAL ECA

Visits to the United States by six groups of Norwegian technicians to study American methods of mining, manganese production, steel making, and pulp and paper production have been approved by the Economic Cooperation Administration, according to an announcement out of Washington on April 28.

The study projects are scheduled to start early in May, but the one on pulp and paper production is scheduled for later in the summer.

Approval of the new projects brings to nine the number of studies arranged for Norwegian experts under ECA's program for providing technical assistance to countries participating in the European Recovery Program. Seven trade unionists from Norway, the first team to come to the United States, have concluded their visit. A Norwegian veterinarian and two forestry experts now are in this country making studies in their respective fields.

United States equipment and methods used in the production of pulp and paper will be studied by Capt. Borre Morch, assistant mill manager of Follum Fabrikker, a Norwegian paper mill, during a three to four months' visit, starting about August 15. He is interested in studying the use of liquid sulphur dioxide in chemical pulp production, bleaching processes, barking and handling of logs, and modern types of paper printing machines, calenders, screens and beaters.

▼

NEPCO OFFERS FREE TREES

Seedling pines—130,000 of them—are being offered by the forestry division of Nekoosa-Edwards Paper Company, Port Edwards, Wisconsin, at no charge, to farmers and others interested in planting areas of land not suitable for other crops. The trees, principally Norway and Jack Pine seedlings, are being furnished to interested parties of central Wisconsin.

In addition to making the trees available for planting on submarginal lands, the company is offering the use of its mechanical tree planting equipment to those ordering in excess of 2,000 trees. The Nekoosa staff of trained foresters will give advice and help, also on a no cost basis, to those who receive free trees.

The offering of free trees is part of the Nekoosa-Edwards program to perpetuate the sources of raw materials by converting to reforestation the large areas of land not suitable for other purposes, and by this means it is possible for farmers to have a profitable cash crop for the years to come, through sound forest management. In addition, the benefits derived by residents of Wisconsin and the nation as a whole from the conservation of wildlife resulting from reforestation will continue to multiply as years go by.

The Nekoosa-Edwards program was put into effect in 1926, and has been operating continuously during the past 23 years. The plan calls for the planting of tens of thousands more trees than the mills consume with as many as 4,000,000 having been planted in some years.

▼

THIRTY RED CROSS TRAINEES HONORED BY RIEGEL PAPER

Thirty employees who completed a special first aid class were recently honored by the Riegel Paper Corporation. The Red Cross instructor was Bryan Overbeck, a maintenance man in the converting department of the company's Milford mill. The course was designed to provide sufficient knowledge of first aid to meet serious emergencies before professional help arrives, and one person on each shift and in each department and mill at Riegel took the course, which was sponsored by the company's medical department.

A certificate was awarded to each of the thirty men and a medallion was presented to Mr. Overbeck for his work as instructor. In adapting the first aid program to paper mill operations, Mr. Overbeck combined his experience in Red Cross techniques and his knowledge of papermaking operations.

▼

▶▶▶ AS PART OF a machine rebuilding program designed to increase production and streamline facilities, the Ohio Boxboard Company, Rittman, Ohio, plans to add a 2-high dryer section to one of its board machines. The contract, which was awarded to Lukenweld, a division of Lukens Steel Company, Coatesville, Pennsylvania, calls for 12 jacketed steel rolls, 60 inch O.D. x 128 inch face with frames, bearings, gears and other parts to be installed at the wet end of the No. 2 machine.

Your New ROSS-GREWIN SYSTEM

WILL EMBODY ALL THESE 6 MAJOR IMPROVEMENTS

1. All air is filtered.
2. Thoroughly air tight heater casings and piping.
3. Higher air temperature.
4. Graduated and easily interchangeable orifices.
5. Air also supplied to Dryer Felt Pockets.
6. Front drop pipes are installed inside frames where possible for safety of operator.

When you compare the modern ROSS-GREWIN System with those we installed years ago, you will appreciate the value of the many improvements that have been made in recent years. Our long experience gained from installing ROSS-GREWIN Systems on nearly 400 machines enabled us to improve the design and construction to assure a system which now retains its high original effectiveness indefinitely.

To get the full, lasting benefits of these six major improvements, make sure that your new ROSS-GREWIN System is properly constructed to incorporate them.

Your nearest ROSS office will gladly furnish complete detailed information.

and now you get 7

7. Centrifugal type Compressor with hand-wheel operated volume damper, which allows instantaneous and accurate adjustment of air pressure to suit the grade of paper being produced.

Reduced reproduction of advertisement published in 1948 issues of leading trade magazines.

No past accomplishment is ever considered "good enough" for ROSS engineers. ROSS Systems are continually being improved to provide increasing measures of economical efficiency in the production of pulp and paper. These additional features and design changes and improvements in ROSS Systems are planned to keep pace with changes in mills and machine designs, production and operating methods, basic materials and finished products.

Make sure that your ROSS-GREWIN System is properly constructed to incorporate all 7 of these major improvements in its design and operation. If it is new and needed you can be sure ROSS will supply it.

Perhaps your ROSS-GREWIN System can be revamped to provide some or all of these new features at relatively small cost.

ROSS SYSTEMS

J. O. ROSS ENGINEERING CORPORATION

MANUFACTURERS OF AIR PROCESSING SYSTEMS

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When *Quality*
NOPCO PAPER CHEMICALS

. . . for Nopco Paper Chemicals are specifically designed to meet the varied needs of pulp and paper manufacture—to help produce paper that promotes customer satisfaction, repeat business, word-of-mouth recommendation, increased sales.

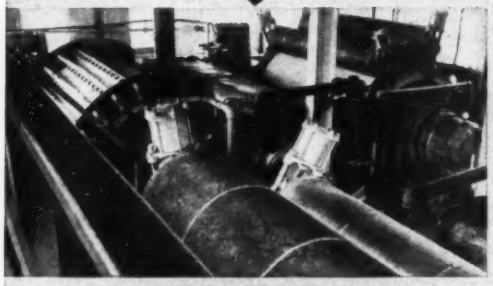
Nopco Paper Chemicals eliminate many operating difficulties, cut costs, save time, improve the finished sheet. In addition to items listed here, they include soaps, synthetic resin emulsions, plasticizers and lubricants for use in all phases of manufacture—whether paper, paper board, insulating board, pulping and rag cooking, tissue, or converting. Full information is yours for the asking. Write us today.

Courtesy of Eastern Corp., Bangor, Me.

DIGESTER

NOPCO Nopalcol*
An additive that helps to reduce cooking time of sulphite pulp.

Pitch Control is initiated here by the addition of a solvent. This solvent aids in keeping liberated pitch in solution so it may be effectively handled later in the system.



WASHERS

Pitch Control

NOPCO 1216-V Used in the Washer, Nopco 1216-V emulsifies the solvent and the pitch in the solvent to reduce the liberated pitch content of sulphite pulp.

Foam Control

NOPCO KF (for Sulphite) With its unique ability to destroy foam, Nopco KF increases the operating efficiency of pulp screening and pulp refining equipment.

NOPCO 1333-B (for Kraft) Here is a highly concentrated product that eliminates foam and promotes efficiency in the production of sulphate pulp.

OTHER EFFICIENT NOPCO DEFOAMERS for use in pulping and bleaching operations are: NOPCO KFH, NOPCO KFS, NOPCO 1519, NOPCO Vegifat Y.

BEATER

Sizing

NOPCO 2251-X, NOPCO 2251-B These anhydrous wax size bases are prepared for easy handling in the mill. Nopco 2251-X requires the addition of water only; Nopco 2251-B, the addition of wax and water. Both yield emulsions stable from infinite dilutions up to 70% solids.

NOPCO 2252 — Paraffin Wax Size An efficient sizing agent, giving a consistently uniform size unaffected by water conditions, pumping action or operating temperature. Equally effective in all types of furnishes. Stable in any dilution. Ideal for mills with small requirements or limited mixing facilities.

NOPCO 2146-R A high free rosin size emulsion, particularly valuable in hard water areas.

NOPCO Size I An efficient waterproofing agent for asbestos paper—and photographic printing papers, where chemical stability of sizing agent is essential.

Softening

NOPCO Softener #73 Specifically formulated for use in manufacture of high grade tissue and towelling. Stabilizes the absorbency of the finished sheet and gives unusual softness. The affinity which this cationic softener has for the fibers, permits its addition at the beater or at any convenient point in the stock preparation cycle.

NOPCO ® EVOLVED THRU RESEARCH

NOPCO CHEMICAL
Formerly National Oil Products

does the talking

turn Prospects into Buyers

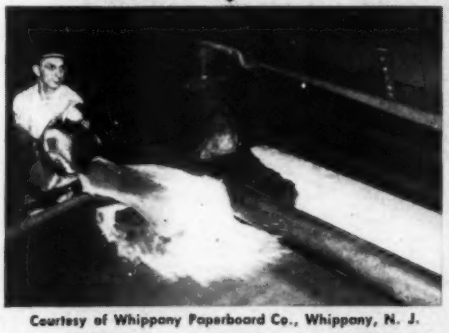
"WET" END OF PAPER MACHINE

Sheet Formation

NOPCO KF Improves sheet formation, even at increased machine speeds, by eliminating foam and faulty fiber dispersion; dissipates entrained air. Outstanding advantages: at least 75% reduction of thin spots, reduced breaks; improved surface characteristics.

Clean Up

NOPCO 1216-V This emulsifier, when used with a solvent, removes asphalt and pitch deposits from metallic surfaces. An excellent medium for cleaning screens, wire and suction rolls.

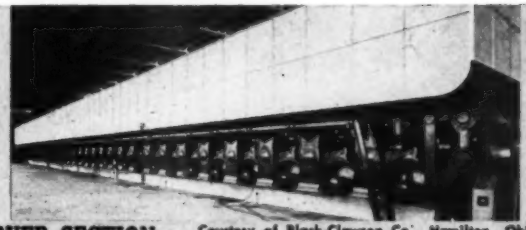


Courtesy of Whippany Paperboard Co., Whippany, N. J.

PRESSES

Felt Washing

NOPCO Syntergent*K A felt washing compound that may be used on or off the machine. Mixes readily with warm or cold water; gives a rich, persistent lather. Dispersible and stable in dilute acid or alkaline mediums. Rinses out freely when washing is complete; leaves felt soft and well napped.



Courtesy of Black-Clawson Co., Hamilton, Ohio

DRYER SECTION

Machine Coating

NOPCO ESI Improves flow characteristics as well as brightness and gloss. May be used in casein or starch coatings.

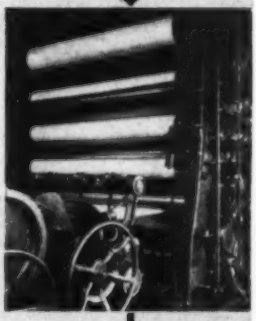
NOPCO 1400-B (Ammonium Stearate)

Functions as a plasticizer, and aids in controlling dusting on the calender rolls.

MACHINE CALENDER STACK

NOPCO 2252 — Paraffin Wax Size Besides being used in the Beater, Nopco 2252 may be used as top or surface size in the Size Press or Calender Water Box. Often employed with starch, glue or casein emulsions. Improves printing qualities and increases scuff resistance of paper board.

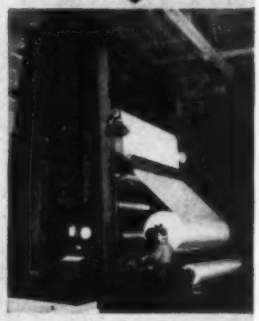
NOPCO ESI Used in conjunction with starch to improve gloss ink printing on folding box board.



CONVENTIONAL COATING

NOPCO 1400-B (Ammonium Stearate) Added to coating color formulations, Nopco 1400-B plasticizes the coating; helps to minimize dusting during supercalendering.

NOPCO 1600-B May be used advantageously for all general defoaming and evening requirements. Minimizes fish eyes and similar defects. Works well with colored coatings...



NOPCO Sulfonated Oils and Fats Incorporated into the coating mix, these materials impart plasticity, reduce foam, promote evenness of application.

NOPCO ESI Flow, brushing characteristics, brightness and gloss of casein and starch coatings are all improved by addition of Nopco ESI. Dusting troubles usually developing on the Super Calender are substantially reduced when Nopco ESI is added to coating color formulations.

NOPCO 1810-L — Wax Emulsion An acid stable wax size used to impart plasticity to coating color mixes.

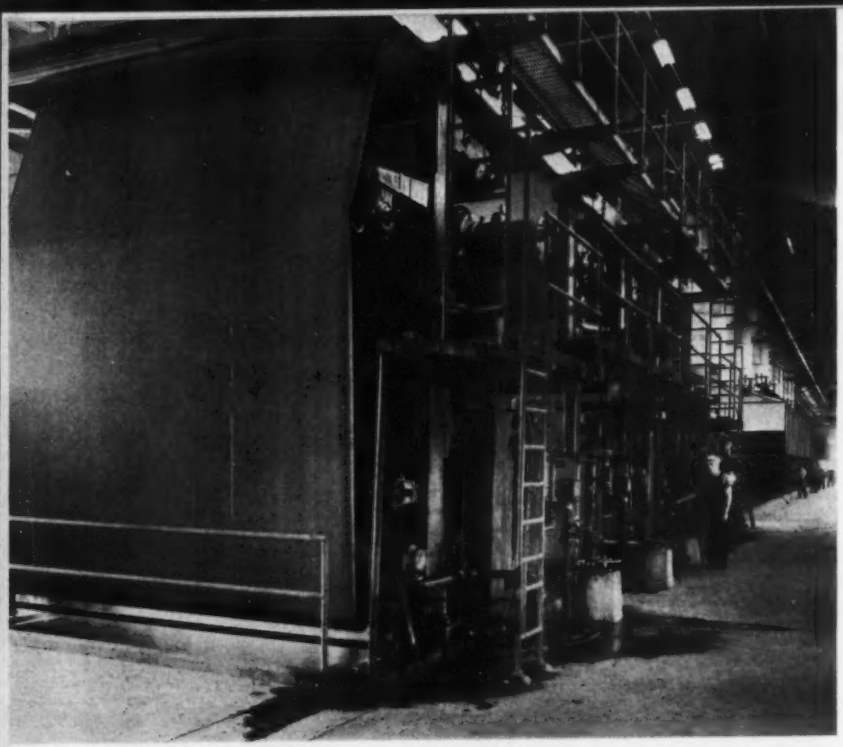
*Reg. U. S. Pat. Off.

COMPANY

Company

HARRISON, NEW JERSEY

Branches: BOSTON • CHICAGO • CEDARTOWN, GA. • RICHMOND, CAL.



Wet end of new Black-Clawson 5-cylinder board machine; press rolls are air loaded and level of stock in vats is automatically controlled

Liner board is wound on reel after passing over 66 dryers and through 2 calender stacks; wet finish is applied at 1st calender

Fairfield

▶▶▶ NEWEST MILL in the Midwest is at Baltimore, Ohio, where the Fairfield Paper and Container Company recently started a complete new board manufacturing unit. This new mill, designed to turn out over 150 tons of cylinder test liner or chipboard per day, is completely equipped with the latest design stock preparation system and cylinder board machine manufactured by The Black-Clawson Company, Hamilton, Ohio.

But this is only part of the expansion program. Similar to many mills throughout the country, Fairfield's steam requirements have grown to far exceed its boiler plant capacity. So, in addition to the new mill, the steam plant is being modernized and expanded with the installation of a new Babcock and Wilcox boiler. Even now, the new board machine's capacity is restricted, because until the power plant work is completed there won't be enough steam for drying. Construction of the new boiler is still under way but is fast nearing completion.

Key members of this company who were responsible for this expansion program are: M. D. Custer, president and treasurer; H. L. Custer, vice president and general manager; J. C. Stinson, paper mill superintendent; E. C. Artz, power superintendent; C. L. Weaver, plant engineer; Hugh Morrison, box plant superintendent; and W. O. Woodward, sales manager. Other officials of the company are P. H. Snider, secretary, and Margaret Gallagher, assistant secretary.

The original mill was built some 15 or 20 years before the turn of the century but not until 1907 did the then newly organized Fairfield Paper Company take over the property. Throughout the years the plant grew into a fully integrated paperboard and box plant. In 1922, a new machine was added but aside from this, a good many modernization programs have taken place since the plant was first built. Now that the new mill is in operation, however, the original machine, some 65 years old, will be disposed of. Actually, the old machine ceased operating only last December.

Engineering and construction of the new mill was handled by the Austin Company, but a number of other concerns were involved in important phases of the work. These include Gustav

Starts New Board Mill in Ohio

Hirsch Organization, Inc., Columbus, Ohio electrical installation; The Miller Company, Meriden, Conn., lighting installation; The Hoffman Wolfe Company, Columbus, Ohio, piping installation; and W. F. Barrows & Associates, Dayton, Ohio, consulting engineers for the steam and power plant.

Jim Stinson, superintendent, with Paul Besse; Grover Jones, mill maintenance foreman; and Russell George, machine tender

The Building

The new mill is housed in a two-story, L-shaped structure built up against the old No. 2 machine room and box plant. Over-all length of the new building is nearly 500 ft. The machine room part is 50 ft wide x 400 ft long and the beater room part is 120 ft wide x 100 ft long. Designed and built by the Austin Company, this modern building has walls of brick, glass brick and corrugated sheet Transite. The built up paper and asphalt roof surface is laid on creosoted wood planking supported by structural steel members. Fire protection is provided by a sprinkler system.

Lighting and ventilation are two most important factors in modern building design. Maximum utilization of natural light is achieved by the extensive use of glass brick and glass windows. An 8 ft wide band of glass brick extends completely around the three outside walls of the new building. By diffusing direct sunlight the glass brick aids in preventing excessive glare and adds to the physical comfort of the operating personnel.

Although natural light is utilized to the fullest extent, a well designed lighting system permits complete independence of outside light. Installed by The Miller Company, the lighting system provides a minimum of 45-foot candles throughout the machine room and stock preparation room. Over 250 fluorescent lights, each with 2 tubes, are augmented by about 65 flood lights (750 and 1000 watts).

Good ventilation is essential to any modern paper mill. In addition to the vapor removal and hot air system of the paper machine dryers, are the fresh air and recirculating heaters. Five 20,000 cfm variable temperature fresh air supply units made by L. J. Wing Manufacturing Company are located near the roof and are spaced about 80 ft apart from the dry end of the machine through the machine room and beater room. These have four fixed outlets to distribute the incoming fresh air. A recirculating heater is located at the dry end of the machine and another one above the outside entrance to the stock preparation room. The latter has a high velocity discharge outlet that delivers a curtain of warm air across the door opening to temper cold air coming in.

Introduction of heated fresh air into the machine room during cold weather prevents condensation on the building structure and retards fogging to a considerable extent. In warm weather, of course, outside air is brought in through these units without being heated.

Stock Preparation

Cylinder test liner and chipboard are two major grades of paper board made on the new machine and the raw materials used consist mainly of various grades of waste including corrugated and mixed kraft wastes. Some unbleached kraft pulp is used in certain grades. On test liner the first 4 molds of the machine run filler of mixed kraft waste while the 5th mold runs a top liner of kraft.

Furnish to the machine is prepared in a two-stock system. A complete Shartle-Dilts stock preparation and cleaning system was installed for this purpose. The system employs two Hydrapulpers, a Hydrafiner and five jordans together with cleaning equipment, thickeners and agitators.

Bales of raw filler stock are transported from storage with fork trucks and dumped into the 20-ft continuous Hydrapulper equipped with an automatic junk remover and ragger. Simultaneously, white water that has passed through a shell and tube heat exchanger to raise its temperature is pumped into the Hydrapulper. The ragger removes baling wires, rags and string while the junk remover continuously removes heavy trash that is too large to pass through the perforated extraction plates of the Hydrapulper. Defibered filler stock passes through the extraction plates to the regulating box from which it is continuously discharged to the cyclone inlet of the grit remover. Here it is diluted with white water to permit the ready settling of heavy grit in the primary settling chamber. Grit is removed from the bottom of the settling chamber by a conveyor system that discharges this material to a hopper, thence to a receiver in the basement.

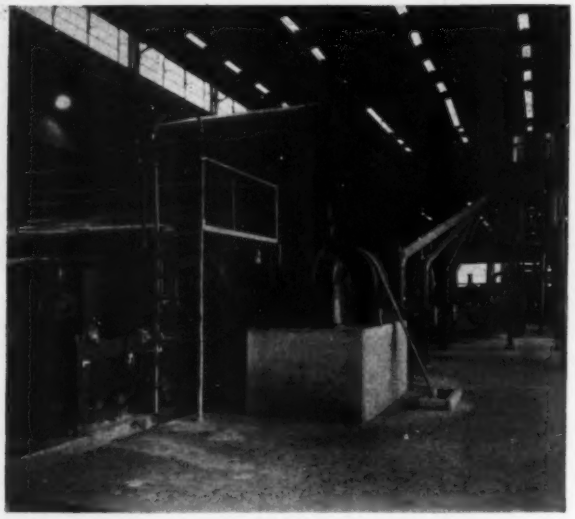
Stock then passes through two Dilts Classifiners where floating rejects are screened out and run through a disintegrater pump and Selectrap for final separation of usable fiber from reject material. Fiber is returned to the Hydrapulper and rejects discarded.

Accepted stock from the Classifiners is sent to the second settling chamber of the grit remover and then to three

Charging the Hydrapulper; ragger and junk removers take out foreign matter; grit remover is at upper left

Rejects are removed in two Classifiners; they are disintegrated and fiber recovered in Selectrap

Agi-flow pumps on stock chests provide constant delivery of stock at uniform consistency



Liner stock is screened in 2 Selectifiers while filler goes direct to machine

air operated thickeners. Thickened stock is then dropped to the filler dump chests from whence it is pumped to the jordan regulating headbox.

Liner stock is defibered in a 16-ft batch operated Hydrapulper that discharges to either of two liner cycling chests serving a single Hydrafiner. Flexibility of piping and valve systems permits recycling of stock to either cycling chest before being pumped to the liner dump chest. Operation of the liner stock preparation system is remotely controlled from the control panel on the operating floor. Motorized valves (Hope type) are used in the Hydrafiner piping system. From the liner dump chest the stock goes to the jordan regulating headbox and then passes through the jordans to the liner machine chest. All stock storage chests are equipped with Miami Agi-flo circulation and pumping systems that keep the stock at uniform consistency and provide constant delivery of stock to the jordan headbox and the machine headbox.

Cylinder Machine

Fairfield's newest board machine was built by The Black-Clawson Company and its many features make it an outstanding example of modern paper board machines. Having 5 cylinder molds 60 inches in diameter with a 146-inch face, the machine trims a sheet up to 136 inches wide. It employs 3 suction presses and 2 plain presses. Four sections of double deck 48 inch seamless dryers are followed by two calender stacks, reel and rewinder. The machine is driven by a G-E 350 hp, 450 rpm d-c motor through a line shaft in the basement which transmits power to the various section drive units by means of leather belting. The spiral bevel gear drive units are equipped with Fawick Airflex clutches that are remotely controlled from the front side of the machine.

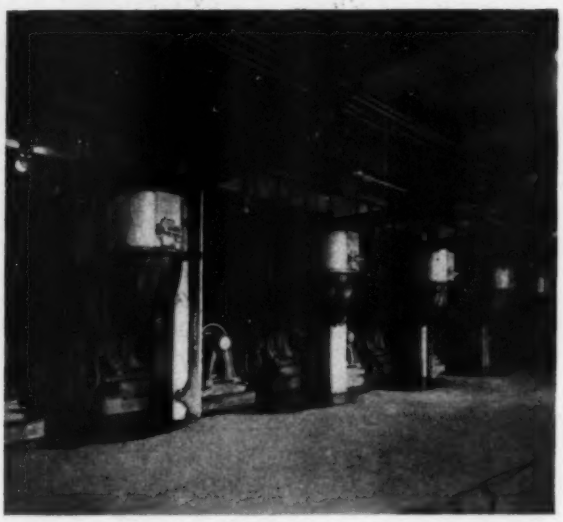
Filler stock passes direct from the machine headbox to the machine while liner stock goes through two Miami Selectifier screens. These compact vertical screen units operate under pressure and are wholly enclosed. Rejects from the Selectifier screen discharge to a sump and are pumped back to the Hydrapulper.

Each of the five overflow type vats is equipped with a Black-Clawson Hydronamic inlet and individual circulating pump. Stock from the headbox is mixed with white water and with the overflow from the vat in a 12-inch Shartle circulating pump (rated capacity: 6500 gpm, 16-ft head, operating at 425 rpm with a V-belt motor drive). This pump discharges to the stainless steel Hydronamic inlet which is designed to provide uniform distribution of stock to the vat. Each vat is equipped with automatic level control unit which operates a by-pass valve in the overflow dam or a motorized control valve in pipe to the circulating pump. The overflow dam is adjusted manually.

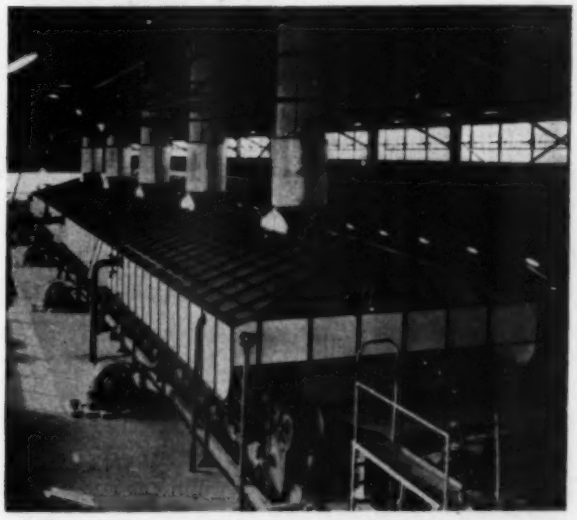
White water is held in storage chests below the level of the ground floor. This permits easy access to the stock inlets and pumps under the wet end

Liner stock is pulped in 16 ft Hydrapulper then cycled through the Hydrafiner

Jordans fed by gravity from regulating box; note white water heater for Hydrapulpers at left



Hydronamic inlets—stock enters center of cross pipe and is evenly distributed to vats



Ross hood covers dryers; sleeves on exhaust stacks may be raised to permit passage of traveling crane

of the machine. Similarly, the use of the Selectifier screens in place of the conventional type flat or rotary screens and mixing boxes make the back side of the machine just as accessible as the front side and adds to the neat appearance of the wet end installation.

Wet End Water Removal

While the main suction press is driven from the line shaft in the basement through a spiral bevel gear unit, each of the cylinder molds, and the primary and suction drum presses is equipped with a d-c air-cooled helper motor. This takes the strain off the bottom felt and improves controllability of the machine. Formation is aided and foam retarded by the Clarage fans driven by Howell motors installed on each vat to exhaust air from the inside of the rotating mold above the level of the white water.

Water is extracted from the formed sheet by both suction and plain press rolls. All press rolls, except the main suction press, are arranged in the superstructure above the cylinder molds. Coming off No. 5 mold, the sheet passes in succession through the suction drum press, 1st primary (plain squeeze rolls), 2nd primary (suction), 3rd primary (plain squeeze rolls), and the main suction press. The suction drum roll, the 2nd primary suction roll are brass covered and the top roll of the main press is Stonite. All other press rolls and the cylinder couch rolls are rubber-covered.

Before going to the 1st mold, the 173 ft long bottom felt is given a fresh water shower and subjected to the action of a whipper followed by a 14-in diameter felt suction roll to extract water from the felt. Similarly, the 135 ft long top felt goes through a shower and whipper, then over a suction box (a slotted pipe) before entering the suction drum press. Gilbert and Nash felt guides are used. Deckle showers located between No. 5 mold and the suction drum press trim the wet edges of the sheet.

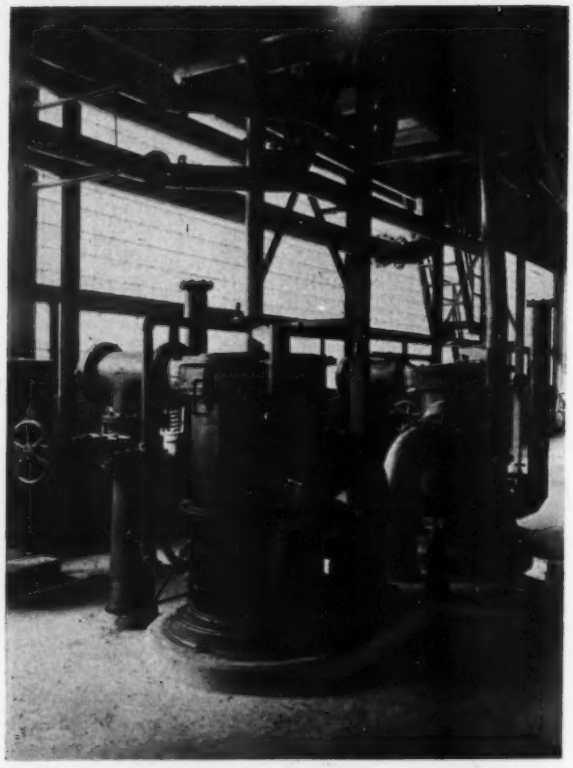
Individual Nash vacuum pumps are hooked up to each of the suction rolls, to the bottom felt suction roll and the top felt suction box. The main suction drum roll discharges through a separator tank. A centrifugal pump removes the white water from the bottom of the separator while the air passes out the top to the vacuum pump. All other vacuum pumps handle both water and air together.

Drying

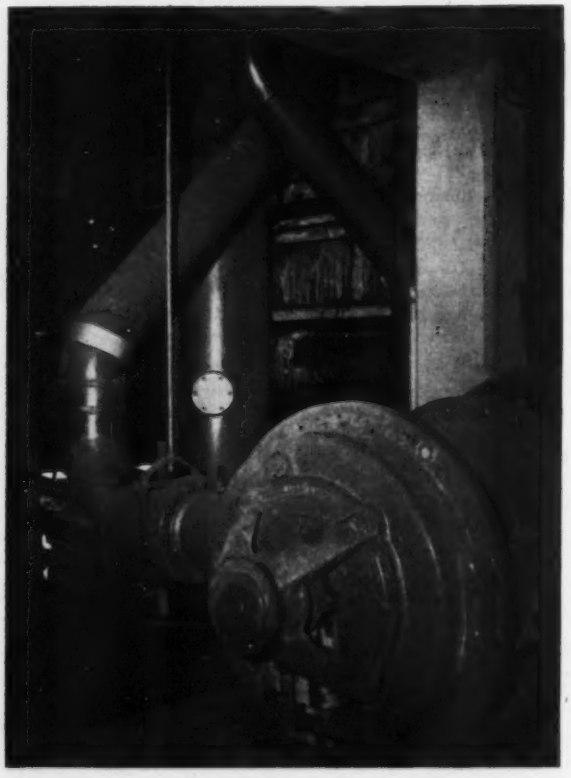
From the main press the sheet goes direct to the four sections of dryers comprised of sixty-six 48-inch seamless dryers and one 24-inch pony dryer. Dryers are equipped with top felts on the first three sections but no bottom canvas is used. A steel grating is installed under the dryer sections about 7 feet above the ground floor level to catch any broke from the machine.

The J. O. Ross Engineering Company hood and exhaust system is fairly standard. The hot air system on the machine is a combination Vapor Absorption and Dryjector system. Exhaust

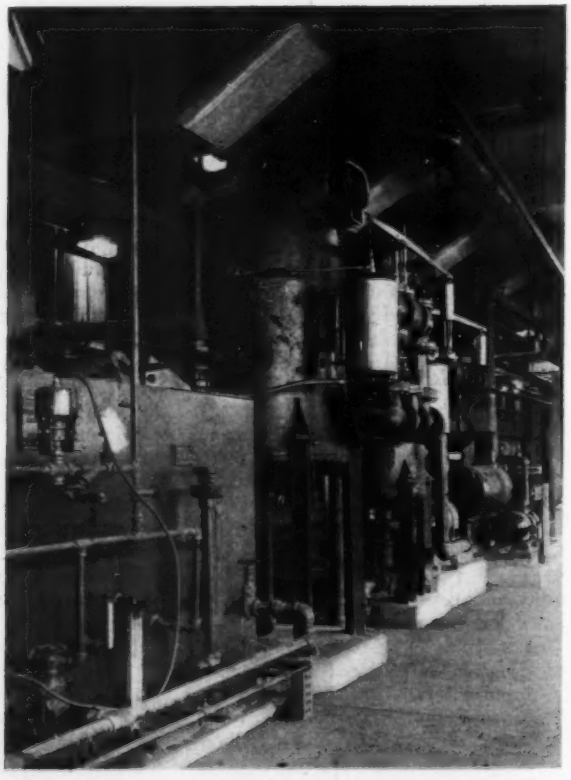
Main G-E control panel faces wet end of machine; Foxboro panels control air-loaded press rolls



Selectifiers used for liner stock are completely enclosed vertical screen units



Nash pump with air-water separator provides vacuum for the suction drum roll



Bowser lubrication unit (left) and Midwest-Fulton forced vapor circulating system

stacks above the hood are equipped with slip joints that may be raised by means of individually operated Hanna air cylinders to permit passage of the P&H power operated crane from the dry end of the machine to the wet end. The crane tracks extend the full length of the machine room. A chain operated 7½ ton Whiting crane, on the same tracks, is kept at the wet end of the machine.

Steam to the dryers is regulated by a control valve in the main steam line. A Midwest-Fulton forced vapor circulating system is employed wherein flash steam from hot condensate from the dry end sections is reused to heat preceding dryers. Final condensate from the dryers, together with other condensate from the mill, is collected in a surge tank and returned to the boiler house by Jennings condensate pumps.

Lubrication of the machine is handled by a Bowser pressure system. Oil is pumped at 18 gpm from the 1500-gal recovery tank through filters and then discharged to the sight feed oilers mounted on the dryer roll bearings. The receiving tank is large enough to permit sixty minutes retention time to allow water and other foreign material to settle out. Pressure in the system is held constant by a pressure regulating valve installed on the main supply lines to the bearings. This assures constant pressure throughout the feed system. Automatic controls are so arranged that in the event of failure of the service pump, the spare pump will cut in by action of a pressure switch. If for any reason both pumps should fail to maintain pressure, an alarm is sounded.

Doctors are installed on certain of the dryers to prevent wrapping and to keep them clean. Dryers are equipped with Sheahan rope carriers. Two 7-roll calender stacks follow the dryers. CMC mixed in a tank in the basement is pumped to the first calender to impart a finish to the board. From the calenders the board is wound on a Pope type reel. A Cameron rewinder with direct electric motor drives is used to make the desired size rolls for conversion to boxes. Rolls are weighed on a Toledo platform scale and transferred to storage or to the boxshop.

An old Dayton beater was rebuilt and installed as a broke beater in the basement at the dry end of the machine. Slushed broke is then pumped back to the Hydrapulper for reuse. Also located in the basement is an Ingersoll-Rand compressor that furnishes compressed air for operating controllers and for applying pressure to the press rolls. American Blower fans are used to provide cooling air to most of the electric motors throughout the mill.

Automatic Control

Instead of a system of levers and weights, pressure is applied to the press rolls by means of air operated cylinders controlled at a Foxboro pressure control panel. Gauges mounted on the panel board indicate the pressure applied to the front and back of each press roll. Manually-operated pressure regulators are used to adjust the pressure to the desired valve. This makes it possible for the machine tender to regulate accurately the amount of work handled by each press. Rubber couch rolls on the cylinder molds are weight loaded.

All pumps and motor driven equipment are controlled from G-E panels facing the front of the machine. Signal lights on the panels make it easy for the machine tender to ascertain the operating status of all equipment. Speed of the machine is adjusted by push button control of the drive motor. Draws between the different sections of the machine are controlled by manual adjustment of the belt positioner on the conical drive pulleys. Air clutches on the individual drive units make it possible to start and stop each section by remote control from the front side of the machine. A Brown Moistograph is being installed to measure the amount of moisture in the sheet. Detector rolls for the instrument are located on the last dryer.

Electrical System

While the installation of electrical equipment was handled by Gustav Hirsch Organization, Inc., most of the electric motors, as well as control and switch gear equipment, were furnished by General Electric. Distribution transformers were manufactured by the R. E. Uptegraff Manufacturing Company, Scottsdale, Pa. The switching and control equipment of the new mill is designed to eliminate unnecessary manual operators. Every type of safety control possible is used in operation of the mill.

Five Cabinetrol units were installed for controlling all motors 50 hp and less. These metal-enclosed groups of motor starters were not only selected for the protection that they provide against underloading and short circuit conditions but they were also coordinated in order that controls identified with an individual process could be grouped together in a metal enclosed factory-assembled unit. Included are motor operated stock valves which are interlocked against human errors, oiling system controls complete with warning signals, automatic standby control and process instrumentation.

In general, this distribution and motor control system has been designed to protect the mill property and mill personnel against the costly effects of uncontrolled short circuits. At the same time the mill control is laid out in such a manner as to assure completely coordinated mill functions.

Boiler House

Expansion of paper production always means additional steam requirements. Not only is a new boiler being installed but the feed water treatment system is also being modernized.

The new B&W boiler is a Stirling two-drum unit with a continuous capacity of 80,000 lb per hr at 450 psi and a total steam temperature of 750 Fahr. Equipped with a superheater and economizer it is fired with a 4-section Hoffman Firite spreader type stoker. The traveling grate has a dual drive consisting of an electric motor and an Elliott steam turbine to insure against power failure. Down spouts for coal from the 100-ton overhead bunker are equipped with Bailey coal meters. The new coal unloading and handling system was installed by the Fairfield Engineering Company.

Equipped with a 100 ft steel stub stack and a Prat-Daniel Corporation Thermix tubular dust collector and reinjector system, the boiler uses both forced and induced draft fans supplied by American Blower Corporation. An Elliott mechanical drive steam turbine is used for the induced draft fan while a G-E motor powers the forced draft fan. Other equipment included in the installation is a Goulds boiler feed pump; Copes water regulator and Copes desuperheater; Yarway blowoff valves; water level indicator and water column; Hagan combustion control; Diamond soot blowing equipment; Lagonda water driven tube cleaners (Elliott Co.). New ash handling equipment was installed by United Conveyor Corporation. This includes a new tile hopper, air washer and dustless unloader. Insulation for the boiler was provided by the Philip Carey Manufacturing Company. A new Fuller 2-stage rotary air compressor has been installed together with an R. D. Adams aftercooler.

Feed Water Treating

Feed water treating facilities also have been expanded and modernized. A new 175,000 lb per hour Cochrane atomizing deaerator with a horizontal storage tank has been installed and the old hot power line soda softener has been revamped. New chemical tanks and proportioning pumps have been added. A Cochrane-Becker condensate return unit has been installed to handle condensate from corrugators in the box plant.

The French Paper Industry Today

JAMES H. DUTRUC

The author grew up in a papermaking environment. His father was technical manager of the French mill, Papeteries J. B. Weibel. After two years of work in the Weibel paper and bag plant, Monsieur Dutruc studied chemistry and zoology at the University of Besancon. During 1945, he served in the French air force on duty in Germany and North Africa. Then he spent a year as draftsman for Neyret Beylier, a French machinery constructor, after which he returned to Papeteries J. B. Weibel as a designer. In this connection, he set up a sulphite pulp laboratory being erected by the Weibel Company. Now in the States for the purpose of becoming acquainted with the American technique of papermaking and machinery manufacture, Monsieur Dutruc has spent the past several months at the plant of Shartle Bros. Machine Company, in Middletown, Ohio.

▸▸▸ BASICALLY, papermaking is the same in France as in the United States, although the application of the principles is characterized by the French economic system and the mentality of its people. Within the limits of this article, it would not be possible to cover the entire field of papermaking in France. However, the comments made here may bring about a better understanding of the general operation and methods, as well as the severe obstacles with which the French paper mills are presently faced.

The French paper industry is facing one of its most difficult periods, attributable to the shortages of coal, electricity, and fibrous raw materials. These shortages force the managements of the various mills to extend their activities in respect to stretching the supplies of raw materials by improvement of techniques and equipment. The war has delayed all modernization programs, established in previous years. The financial condition of many mills has suffered in the last few years to such an extent that many of these plans are being cancelled or reduced severely. For these reasons, most of the French paper and pulp mills are concentrating their efforts on a very active maintenance program in an attempt to keep the old equipment in operating condition, and thereby attain the maximum value from the allocations of coal, electricity, pulpwood, etc.

The French paper industry is largely dependent on the importation of raw materials, equipment, as well as fibrous raw materials. Approximately 80 per cent of the consumption of all materials ranging from pulpwood to wood pulp must be obtained from other countries.

According to the latest records, there are about 300 pulp and paper mills in France today, employing nearly 60,000 people. Only three of the pulp mills devote their entire production to the manufacture of pulp for resale on the open market. Most of the others are a part of corporations known as "Societies" and their production is distributed within these corporations to the related paper mills.

The following tabulation showing the approximate production figures for France during 1948 may be of interest:

Paper and Board	*U.S. Tons*
Wrapping papers other than straw	284,000
News, writing and printing	590,000
Board, others than straw	200,000
Lightweight and special papers	61,000
Strawboard and papers	110,000
Pulp	
Groundwood and semi-chemical	320,000
Sulphite unbleached	74,000
Sulphite bleached	11,000
Kraft unbleached	83,000
Others	68,000

Some general comments about the above data may be in order here.

First, the manufacture of wrapping papers is considered to be somewhat less important than that of news, printing, and writing papers. This trend is a consequence of the economic system and also of the mentality of France, indicating a greater interest in the use of paper for writing and reading purposes than in good packing materials for food and other goods. The proportion of board manufactured as compared to papers is quite different from that noticeable in the United States. This may be partly attributed to the wonderful strides the American board industry has made in increasing its production, particularly that of boxes and building board.

While the chemical pulps comprise about 40 per cent of the total production in the United States, they furnish only about 12.5 per cent of the total output of the industry in France, and of this latter quantity, about 60 per cent is made from imported woods.

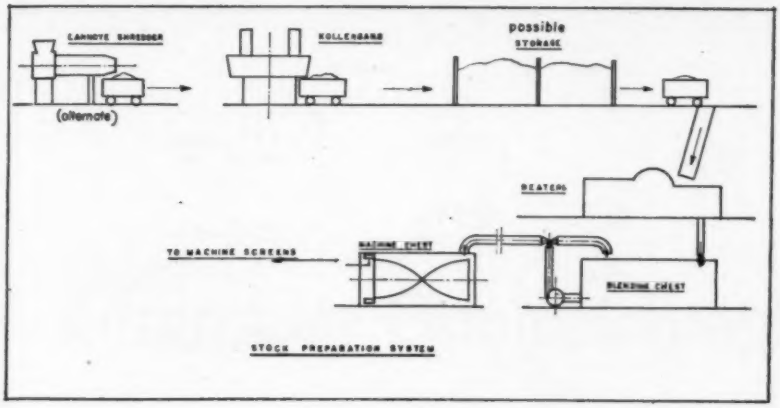
With these general thoughts in mind, it might be well to dwell somewhat on the more specific aspects of pulp and papermaking in France.

PULP INDUSTRY

Chemical Pulp

Only very few mills are devoted to the manufacture of wood pulp by the sulphate process. In fact, the mills engaged in this phase of the pulp and paper industry are all located in the southwestern region of France, since the most important forest of fast-growing coniferous trees are concentrated in this area. As for the process itself, diffusers are in common usage and the recovery system is yet of a type developed some fifteen years ago. The productions of these mills are limited to a maximum individual capacity of 110 tons per day. Since these mills are usually connected with paper mills, this kraft pulp rarely reaches the open market.

As for the sulphite process, only



three mills produce pulp for resale, and only one has facilities for bleaching. Generally, the direct cooking system is used. The Morterud system has not yet found its way into the French sulphite pulp mills. It might be of interest that the majority of the equipment in these pulp mills is of foreign construction.

Mechanical Pulp

The largest proportion of domestic pulp manufactured is groundwood. The erection of several large high speed newsprint machines during prewar days primarily influenced the recent growth of the groundwood industry.

The oldest of the groundwood mills are located in the vicinity of hydraulic power, and have a relatively small capacity. These mills are using pocket grinders and process the pulp in the conventional manner. The pulp leaving the grinder is first submitted to a coarse screening, followed by a fine screening in rotary type units. The tailings are reprocessed in disk refiners and returned to the fine screen. The pulp is then thickened and subsequently exposed to further treatment, the latter depending on the individual mill's design.

In some of the mills the pre-thickening is followed by a Schnekenpress. This units consists of a variable pitch screw, surrounded by a perforated cone, and the pulp is driven by the screw to the small end. The pulp is then stored in a dry state and is shoveled back into carts for furnishing of the beaters, when required. Other mills store groundwood at lower consistency, that is below 5 per cent, and furnish the beaters or blending chests by gravity or pumping.

Since there is quite a variation in the available power during the various seasons, sometimes reducing the production of groundwood to a great extent, some of these small mills are obliged to provide sufficient stock storage space to operate the drying machine or the paper machine as long as two or three weeks without addition of new pulp from the pulp mill.

In connection with the installation of the large new newsprint machines, modern groundwood mills were also built. The location of the modern mills has been for the most part influenced by availability of transportation to easily bring in the imported wood to the mill. The manufacture of groundwood in these mills is performed in continuous grinders with chain feeding system or in Kamyr grinders. The fine screening system is generally a multistage one.

Straw Pulp

Finally another phase of the French pulp industry, using agricultural residues as raw material, may be of interest, since it has gained a great deal of importance in the last few years. In particular, the manufacture of straw pulp is progressing rapidly since there is an abundance of straw available. This pulp is generally employed in the manufacture of low grade wrapping papers and 9-point corrugated. New bleaching facilities presently contemplated will extend the use of straw pulp to better grades of papers.

The pulping process is based either on the use of digesters in connection with a lime liquor cook, or the maceration of the straw at atmospheric pressure in large pits in the presence of cold lime liquor.

After pulping, the straw is washed and then subjected to a short treatment in the köllergang followed by refiners before entering the machine room.

Modern continuous pulping systems are presently in the process of installation and undoubtedly will contribute to a great extent to the utilization of natural domestic resources.

PAPER INDUSTRY

In spite of the fact that the pulp industry in France is gaining constantly in capacity, the paper and board mills still comprise the most important phase of the pulp and paper industry from the point of view of number of mills, as well as comparative production of paper and board versus pulp. In these paper mills we find that the differences between American and French methods of production are most obvious.

Stock Preparation

In considering the first phase of paper manufacture, stock preparation, it should be remembered that almost all the paper mills use imported pulp and that, therefore, slushing equipment of one kind or another is an important part of the paper mill. The köllergang is the main piece of machinery used for this purpose, and bale as well as lap pulp is fed, generally by hand, into the köllergang tub. Fresh water is added and a consistency of approximately 28 to 32 per cent is maintained. The slushed pulp is then dumped by gravity into carts, the latter being used as a means of measuring the weight of stock furnished to the beaters. The pulp may be stored in this dry state before addition to the beaters.

Broke and mixed papers are also handled by the köllergang. However, this unit has the particular disadvantage of requiring a batch operation.

Another machine used in the slushing of baled pulp is the Lannoye shredder. This unit consists chiefly of a shell with stationary blades, inside of which rotates a shaft with other blades affixed to it. The pulp is shredded and torn by the shearing action of the two sets of blades. Some water is added to facilitate the operation. This shredder does not defiberize the pulp as well as the köllergang and cannot be used on broke. However, the operation of this machine is continuous and, therefore, somewhat less power is consumed.

In the larger paper mills breaker beaters particularly, a special type of breaker beater, the Endler beater, is used for slushing. This machine has a perforated cylinder for the continuous removal of the sufficiently slushed pulp. This cylinder is located to the rear of the main roll and rotates in the opposite direction of the roll. The accepted stock may be used at once for the furnish of the beaters after a thickening has brought the consistency up to that used in the beater. Alternately it may go to a Schnecken press or similar equipment to raise the consistency sufficiently for high density storage.

Some mills have a pneumatic system for transporting in this relatively dry state. To accomplish this, pulp is fed by screw conveyor to a hopper, and then, another short screw conveyor car-

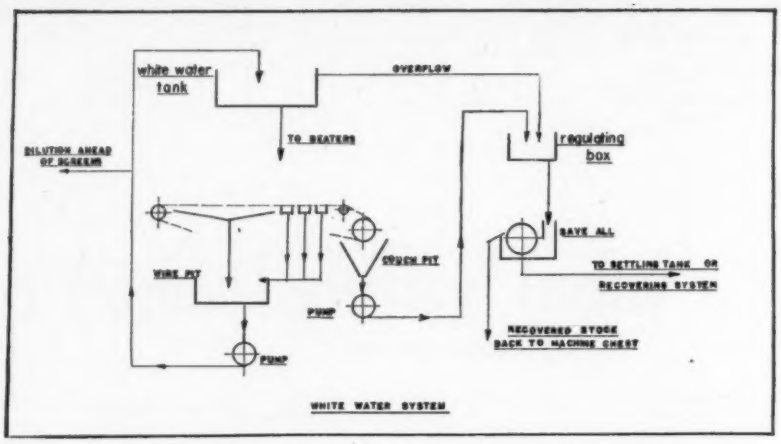
ries it into the discharge line of the air compressor. Consequently, the pulp is blown by air to the point of utilization or storage.

A large variety of types of beaters is presently used in the paper mills. However, the work of the beater is for the most part confined to the actual beating and refining action, since these units are furnished with slushed stock. The degree of beating is usually controlled with the Schopper Riegler freeness testing apparatus. As for the addition of color, size and filler, these may be made in the beaters or alternately in the blending or dump chest. Generally, the beater operation is the same as in the States and the construction of the roll, whether of metallic bars or of lava stone, is usually dependent on mill practice and requirement.

From the beater dump chest, the stock is pumped to the machine room and finally to the paper machine. Generally, Jordans are not commonly used, since the mills mainly use them for blending of different kinds of stock, or to obtain a special cutting action. Machine chests are of the horizontal type and equipped with spiral ribbon agitators. Several catch buckets hanging peripherally on a large bucket wheel pick up the stock from the chest and transfer it to a trough, by dumping at the top of the wheel. These wheels may be as large as 12 to 15 feet in diameter. They insure a continuous and representative removal of the stock from the chest. These machine chests are followed by a riffler for the removal of fine sand and grit. Dilution with white water is effected at the head of the riffler. The stock is finally subjected to a screening in vibrating rotary screens, which may be supplemented by centrifugal screens, Erkansator type, or Vortrap, for fine grade papers.

Paper Machines

The paper machines in France have the same basic characteristics of construction and principle of operation as those in the States. However, there are notable differences which might be of interest, such as the narrower wire width, averaging in France 80 to 90 inches, and the slower speeds, rarely exceeding 300 fpm. Few machines are over 150 inches of wire width, or running faster than 600 fpm. They are all of foreign construction such as German, British, Swedish, American. Different kinds of paper are frequently produced on the same machine, especially on those running at a speed under 300 fpm. Since the French paper machines are fairly old—the average age is around 40 years—they are, for the most part, devoted to the manufacture of specialties. Speeds as low as 45 to 100 fpm are common, and many of these machines are of the cylinder type. Visiting one of these mills represents quite a problem at times, inasmuch as each mill has its own technique of manufacture, its old and experienced employees, and also individual "secrets." The papers produced are mostly fine writing, bank note, filter paper, cigarette paper, etc., for which the French industry is well known.



Turning to some of the specific parts of the paper machine, we might point out that the open head boxes are in common use, but suction couches are relatively rare. The white water is generally collected in two separate pits, one for the water coming from the table rolls and suction boxes, and the other under the couch roll. Since the white water in the couch pit is usually higher consistency than that derived from the wire, it is preferably passed over a save-all or through recovery equipment and then returned directly to the machine chest. The white water collected under the wire, on the other hand, is used for dilution purposes at the head of the riffler and to furnish the beaters. Settling tanks or Sveen-Pedersen flocculation systems are widely used in handling the excess white water. It can be noted that great pains are taken to close the white water system as much as possible and thereby reduce the loss of fiber and filler to a minimum. The inconvenience of having a very tight white water system becomes, of course, more pronounced during changes of color of furnish. The Sveen-Pedersen flocculation system has been very beneficial in overcoming this problem, and therefore, is accepted widely.

As far as the press section is concerned, plain presses and reverse presses are most common, although pneumatic pressure systems are rarely found on the presses.

One difference which can be readily observed is in the dryer section in that the cylinders are spaced further apart to permit safe hand-carrying of the sheet at the start-up or after a break. For this reason very few machines are equipped for heat recovery systems. The vertical dryer stack has not yet found its way into France. As far as size is concerned, one of the largest dryer sections, operating on a board machine, has 50 dryers.

The Yankee type drying cylinder is largely used for machine-glazed papers, since these papers do not need further processing, with the exception of winding and slitting. Consequently lower grades of furnish can be used, which is, in view of the shortage of raw materials, a very desirable feature. Machine-glazed papers are very much in demand in France, particularly for small bags and low grades wrapping papers. The importance of machine-glazing is indicated by the fact that 40 per cent of the paper production and 60 per cent of the board production are processed in this manner.

Finishing Room

The supercalendering, winding, slitting and cutting are frequently performed in another part of the paper mill and the equipment used varies greatly in age, type and construction. For the high-finish papers, separate equipment is used to moisten the paper before it runs through the supercalender, to insure a more uniform penetration of humidity and finish.

The converting of papers is less important in France than in the States, since the main products are cement bags, corrugated boxes and notebooks. Coated papers are fairly uncommon, and impregnation is almost entirely limited to tared papers. In spite of the shortage of specialties converted papers such as photographic and typewriter carbon papers, only a limited quantity of these are presently produced. Gen-

(Turn to page 213)

Adsorption Chromatography of Lignin

A. BAILEY
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▸▸▸ WHILE SOME EVIDENCE suggests that lignin may be a material composed of diverse chemical species, data indicating the kind and degree of the diversity are nonexistent. Almost nothing is known of the possible number of components involved in the parent materials, and almost as little of the kind and degree of heterogeneity to expect of the lignin preparations which one encounters in laboratory experiments, which, through reaction and laborious analysis, provide the basis for the present hypotheses of lignin structure. With this paucity of knowledge it is hardly surprising that lignin constitution is an arena of highly uncertain contest.

An earlier publication *(1)* reviewed briefly the importance of the purity or heterogeneity of lignin preparations used in constitutional studies and noted the diversity of observed phenomena which had been employed to separate lignin preparations into portions with different analytical constants. The variations in these analytical constants suggest that lignin preparations may be heterogeneous mixtures. If this inference is correct, then information on the number of components present, their separation, characterization, and constitution appears to be necessary before the problem of lignin composition, constitution, and utilization can be examined minutely and effectively. The purpose of this article is to report the adsorption behavior of lignin to promote an understanding of lignin complexity, its homogeneity or heterogeneity, the assay of its components or sub-complexes if heterogeneous, and the separation and the characterization of any recognizable identities which might be present.

Previous Adsorption Studies

Samuelson *(5)* adsorbed the nonelectrolyte components and acids from sulphite waste liquor by ion-exchange. He subsequently showed *(6)* these acids to be carboxylic acids of low methoxyl and sulphur content consisting of aldonic acids, sugar sulphonic acids, and lignosulphonic acids. Schröter (7) adsorbed sulphite waste liquor on alumina, obtaining fluorescing zones, but concluded that there was no proof that the fluorescing material was a lignosulphonate.

Adsorbents and Solvents for Lignin

General discussions of the properties and selection of adsorbents and solvents for chromatographic studies are available (cf. Strain, *8*). A general understanding of the many conditions which influence adsorption in a specific experiment is required before adsorbents and solvents can be selected.

While tests of hundreds of adsorbents have been reported, experience has shown that a relatively small selection of adsorbents is adequate for most laboratory requirements. Of this list of about twenty adsorbents, fewer were suitable adsorbents of lignin than was anticipated. Starch, talc, Hyflo Super-Cel, and Celite No. 545 were nonadsorptive, magnesium and calcium oxides reacted with the lignin, and alumina was only weakly adsorptive. Examination of columns of the latter was complicated by the fluorescence of the adsorbent, masking any zones which might have been present, while a flowing chromatogram showed slight difference between adsorbed and unadsorbed phases. In a search for a suitable adsorbent under the experimental conditions required, it was discovered that cellulose was superior to others which were investigated. The kind and chemical history of the cellulose did not appear to be critical since Whatman No. 1, Reeve Angel No. 201, Eaton-Dikeman No. 615, and other filter papers performed similarly, as well as purified bulk cellulose (Solka-Floc SW40, Brown Co., Berlin, N. H.) packed in conventional adsorption columns. The adsorption of lignin on cellulose does not appear to have been reported previously.

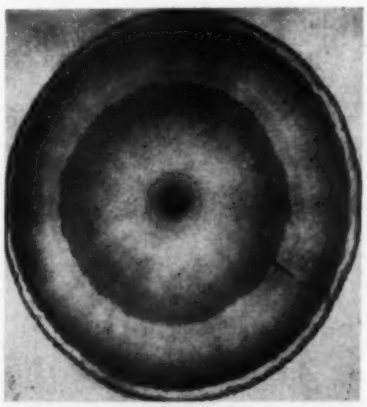

Fig. 1—Photograph of chromatogram of a commercial washable black ink, showing separation of the individual dyes. Water was used as the solvent. The zones formed from the center outward were dark blue, violet, green, red, and yellow. The chromatogram was formed by the procedure given in the text which was also used to form the chromatograms of lignin. Photographed in visible light

Adsorption of lignin is hindered by its insolubility in nonpolar solvents. Solvents which were investigated in this study included a list of thirty-one listed in a previous publication *(1)* selected on the basis of variation of structure such as alcohol, acid, aldehyde, etc. In addition, aqueous mixtures of some of the solvents and mixtures of organic solvents were employed. Solvents had a variable effect depending upon the lignin preparation. Lignosulphonic acids were water-soluble and were generally insoluble in organic solvents. Other lignin preparations were water-insoluble and soluble to a varying degree in organic solvents. The solvents found most useful are noted below in the section on experimental results. Some, such as 1,4-dioxane, pyridine, and glacial acetic acid dissolved the lignin completely

and were suitable as a medium in which to dissolve the lignin in order to deposit it upon the paper support, but were useless as a solvent for adsorption since no adsorption zones were formed, the entire lignin being carried along with the solvent without any deposition.

Lignin Preparations Employed

The following lignin preparations dissolved in a solvent which dissolved the preparation completely were investigated:

Lignin A. Western hemlock (Tsuga heterophylla, Sarg.) lignin prepared by digesting 40 mesh wood meal in equal volumes of water and *n*-butanol, the entire solution made 2 per cent in sodium hydroxide, at a temperature of 160C for four hours. The meal was extracted with fresh portions of liquor until the lignin remaining in the wood was less than 1 per cent. The digestion liquors were combined, the butanol distilled off under 15 mm pressure, the distilland filtered, and precipitated with hydrochloric acid. The precipitate was filtered and washed with distilled water until the wash water gave a negative test for chloride, and air-dried. The dry lignin was dissolved in 1,4-dioxane to make a 4 to 5 per cent solution.

Lignin B. A commercial alkali lignin (Meadol) from mixed hardwoods, dissolved in dioxane to make a 4 to 5 per cent solution.

Lignin C. A commercial sulphite waste liquor from western hemlock, distilled under vacuum, and dissolved in distilled water to make a 4 to 5 per cent solution.

Technic of Adsorption

Among the various technics employed for the testing of adsorbents and the observation of selective deposition were the usual method employing a packed column, the flowing chromatogram, the disc chromatogram of Williams *(9)*, the strip method of Goppelsroeder (cf. Rheinboldt, *3*), and the sheet method of Consden, Gordon, and Martin *(2)*.

The method used to study the chromatographic adsorption of lignin on cellulose and the observation of selective deposition used in obtaining the experimental results reported below consisted of the following steps:

(1) A 175 mm square of Whatman No. 1 filter paper was prewashed with the solvent to be used, by supporting the paper on a watch glass of slightly smaller diameter, applying the solvent dropwise in the center, and allowing capillary action to carry the solvent to the edges of the paper. It was usually desirable to place another watch glass over the paper to prevent evaporation, and to place a small ball of cotton in the center of the filter paper to serve as a reservoir, thus requiring less attention. Cotton thus employed was prewashed by placing on a filter paper, saturating with the solvent repeatedly, and then handling with forceps to avoid contamination. After the solvent reached the edges of the paper, the sheet was hung up in air to dry.

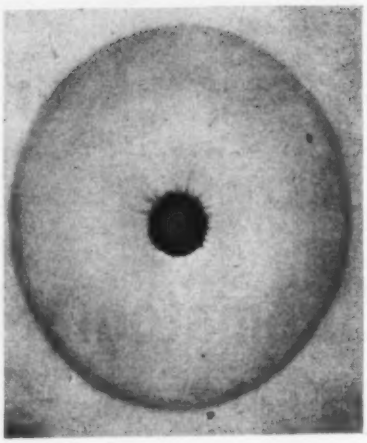

Fig. 2—Photograph of Chromatogram 1 (see text), Lignin A with butanol-methanol (9:1) solvent. Photographed in visible light. Compare with Figure 3

(2) A drop or two of a solution of lignin in 1, 4-dioxane (or other solvent such as pyridine, glacial acetic acid, etc., which dissolved the particular lignin preparation *completely*) was deposited in the center of the paper and allowed to dry. The concentration of the lignin in the dioxane was not critical (4 to 5 per cent was used in these experiments) but was not so great that evaporation of the solvent and deposition of the lignin caused the lignin residue to plug the capillary structure of the paper. The sheet was again air-dried for at least 24 hours. This drying period proved to be essential since effects, as yet unexplained, appeared if it was omitted. It was not possible to begin the adsorption by first saturating the sheet with solvent, since the lignin was only partially soluble in most solvents. Some solvent, in which the lignin was completely soluble such as dioxane, was required to deposit the lignin on the paper, but evaporation of the dioxane was necessary before applying the solvent from which the adsorption occurred.

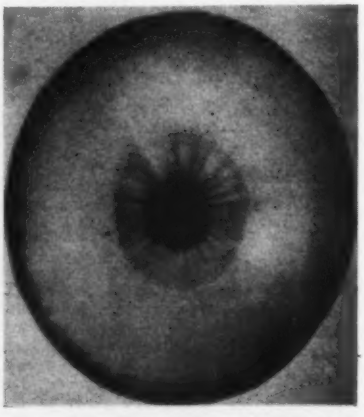

Fig. 3—Same as Figure 2, but photographed by incident ultraviolet light

(3) The paper with the dried spot was placed on the watch glass, and the particular solvent which was selected was added dropwise on the center of the lignin spot. After the liquid front had advanced a centimeter or two by capillarity, a small prewashed cotton ball was placed on the center of the lignin spot as a reservoir for the solvent in order to reduce the attention required. A watch glass inverted over the paper reduced evaporation, as did also the pouring of solvent into the bottom of the lower watch glass. It was essential to keep the capillary action continuous as drying or even too rapid evaporation caused spurious rings. Just before the liquid front reached the ring left by prewashing, the sheet was removed and air-dried. The dry chromatograms were filed as permanent records.

To avoid spurious effects from soluble materials in the filter paper, it was essential to wash the paper in the solvent to be used. The filter paper invariably gave rise to rings which fluoresced in ultraviolet light when water or organic solvent was used alone, without any spot of lignin being present. In practice it was found to be accurate and expedient to prewash the paper by capillarity, exactly as if a sample were present in an extraction experiment, allowing the liquid to travel outside of the edges of the watch glass. Paper which was air dry, oven dried at 100 C, and over calcium chloride, showed no difference in behavior even with solvents immiscible with water. Consden, Gordon and Martin *(2)* discussed the effect of partition when the paper contained water. To study the effect of partition chromatography, water was placed in the lower watch glass and the paper allowed to come to equilibruim with the upper watch glass in place, before applying the solvent.

When it was desired to make comparisons between spots treated with different solvents or spots of different lignin preparations, it was found to be necessary to standardize both the lignin content of the solution used to form

the spot and the size of the spot. Chromatograms could then be duplicated and approximate comparisons made as to behavior. The rate of addition of the solvent to the cotton ball influenced the duplication of chromatograms. The most desirable practice appeared to be to add the solvent slowly and at a uniform rate to the cotton ball. A satisfactory rate of solvent addition was found to be that which caused butanol to spread by capillarity on Whatman No. 1 paper to a circle 55 mm in diameter in approximately 7 minutes. The rate of spreading (and hence addition) varied greatly with the solvent, those of low boiling point, such as ethyl ether and acetone, usually being very rapid, while other properties such as surface tension, viscosity, etc., probably had an influence. Those of high boiling point or high viscosity usually spread slowly. The method of Rutter *(4)* employing small strips cut from the circumference to the center of the paper, which dipped in a container of solvent below was useful in controlling the rate of solvent addition. Various methods utilizing wicks on the uncut paper and feeding the solvent from below by capillary ascent also were employed but the cotton ball method was quite satisfactory.

Adsorption columns of the conventional type, packed with bulk cellulose, were tested but the technics commonly used in packing the column and carrying out the adsorption need refinement and adaption before they will yield results comparable to those obtained with the common adsorbents.

Examination of Chromatograms

The purpose of this study was primarily to learn whether and to what extent adsorption could be used as an analytical tool to determine the number of components in the lignin complex. The discovery of the adsorption of lignin on cellulose necessitated the development of technics, the exploration of the influence of solvents, the observation of the adsorption behavior of lignin, and the determination, if possible, of the number of components which were resolved. While the implications of this separation are fully realized, the logical development of this field of information demanded first the determination of the number of components and their qualitative recognition.

Examination of the chromatograms was most revealing when performed alternately in visible and ultraviolet light throughout the entire formation of the chromatogram. In this way, a fluorescent zone was easily observed and its appearance under ultraviolet irradiation compared with its appearance in visible light. It was also profitable to observe the chromatogram while drying, as some fluorescence disappeared during drying. Information was thus provided on fluorescent zones which were either colored or colorless in daylight and which frequently had a different appearance in solution than when dry. Thus, a zone which fluoresced yellow with solvent present often showed no fluorescence when dry. Chromatograms which had been dried could be re-examined for fluorescence in the presence of the solvent by lightly spraying a portion of the chromatogram with the solvent used. This practice caused little diffusion and migration of zones.

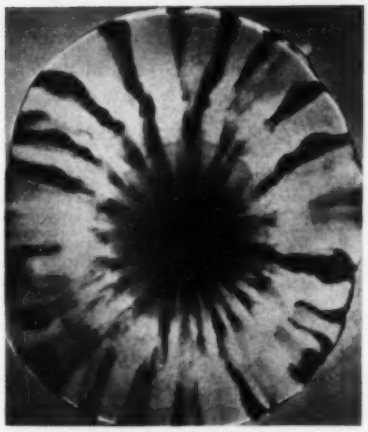

Fig. 4—Photograph of chromatogram of Lignin B with aceton solvent. Photographed with "transmitted" ultraviolet light, with Wratten K2 filter. The interpretation of such a chromatogram is exceedingly complex

It was frequently informative to examine the chromatogram in ultraviolet light from the reverse side as if with "transmitted" light, as well as from the front side by the incident light. It was sometimes an aid to the perception of faint bands to place a dark absorbing sheet (dark brown blotting paper) or a yellow fluorescing sheet (yellow duplicate paper) underneath the chromatogram while inspecting the upper side by incident ultraviolet light. Viewing the chromatogram through monochromatic filters occasionally aided the perception of zones of low visibility. Additional technics commonly used in the examination of colorless and nonfluorescent chromatograms were also applied, although no distinctive color reactions were encountered.

Fig. 5—Photograph of chromatogram of Lignin A with acetone-methanol (9:1) solvent. Photographed by "transmitted" ultraviolet light with K2 filter

The source of ultraviolet light used in these experiments was a Hanovia high pressure electronic discharge quartz mercury arc, No. S 353, with filter No. Sc. 5032 transmitting radiations largely at a wavelength of 3660 A. U.

Experimental Results

The adsorption of lignin preparations upon cellulose was found to exist as a general phenomenon occurring with unrelated lignins and from a wide variety of solvents. All of the lignin preparations subjected to chromatographic adsorption on cellulose in these experiments separated into zones which were chromatographically heterogeneous. The specific number of distinct zones which were observed varied with the particular lignin preparation and the solvent employed. Those solvents which yielded the most favorable differentiation, among the comprehensive group investigated, were as follows:

Lignin A. Methanol, ethanol, butanol-methanol (9:1), aniline, benzyl alcohol, benzaldehyde, quinoline, phenyl cellosolve, and furfural.

Lignin B. Methanol, ethanol, acetone, quinoline, tetrahydrofurane, benzyl alcohol, benzaldehyde, and phenyl cellosolve.

Lignin C. Benzaldehyde and triethanolamine (the latter was slow to spread due to viscosity and because of hygroscopicity was probably that solution which was in equilibrium with the average relative humidity of 35 per cent at 21C which prevailed during the experiment).

The notation used below to report chromatograms of lignin on a paper sheet adsorbent is similar to that employed to report chromatograms in packed chromatographic adsorption columns (cf. Strain, p. 144). Briefly, this is to list the discernible zones in order from the center of the lignin spot toward the outer circumference of the chromatogram, along that single radius which showed the most favorable separation of all the zones present. The zones are designated by Roman numerals beginning with the center and

Chromatogram 1, Lignin A, butanol-methanol (9:1) solvent

Zone	Width, mm	Ultraviolet	Visible
I	9	medium brown	medium brown
II	10	white fluorescence	colorless
III	28	colorless	colorless
IV	4	yellow fluorescence	colorless
V	3	light brown	faint yellow

Chromatogram 2, Lignin A, aniline solvent

Zone	Width, mm	Ultraviolet	Visible
I	10	weak yellow fluorescence	faint tan
II	45	weak absorption	ivory
III	3	dark brownish purple fluorescence	cocoa brown

Chromatogram 3, Lignin A, phenyl cellosolve solvent

Zone	Width, mm	Ultraviolet	Visible
I	10	weak white fluorescence	very faint tan
II	25	colorless	colorless
III	10	slight absorption	colorless
IV	10	colorless	colorless
V	10	almost complete absorption	light tan

Chromatogram 4, Lignin A, furfural solvent

Zone	Width, mm	Ultraviolet	Visible
I	10	weak white fluoresence	colorless
II	25	deep lavender	colorless
III	5	almost complete absorption	medium brown

Chromatogram 5, Lignin B, phenyl cellosolve solvent

Zone	Width, mm	Ultraviolet	Visible
I	12	weak white fluorescence	colorless
II	15	deep lavender	colorless
III	27	almost complete absorption	light brown

Chromatogram 6, Lignin B, benzaldehyde solvent

Zone	Width, mm	Ultraviolet	Visible
I	5	deep lavender	light brown
II	5	medium gray	faint ivory
III	4	medium lavender	faint brown
IV	5	weak white fluorescence	off white
V	4	light brown fluorescence	light brown

Chromatogram 7, Lignin C, triethanolamine solvent

Zone	Width, mm	Ultraviolet	Visible
I	12	dark brown, non-fluorescent	medium brown
II	12	colorless	colorless
III	4	almost black	medium brown
IV	20	colorless	colorless
V	5	light brown fluorescence	medium brown

progressing outward. The width of each zone is recorded in millimeters, followed by a note of its appearance in ultraviolet light and its appearance in visible light. Some of the chromatograms obtained are shown in the accompanying tabulations, observations being made on the dry chromatograms. The fluorescence of the cellulose itself was appropriately discounted.

In the above description, the violet fluorescence of the cellulose was taken as a norm. The net fluorescence found in a particular zone might be lighter or darker than that of the norm. The term absorption refers to that condition in which the light from the norm was decreased without perceptible change in hue. It is unfortunate that quantitative expressions for these descriptions are lacking.

While the above chromatograms represent only a few per cent of the number thus far prepared, they are illustrative of the entire group. The zones recorded in the above chromatograms had sufficient distinction in appearance to justify reporting them individually. It should be noted that while such distinction suggests fractionation, the basis for the distinction was chromatographic heterogeneity. Hence, conclusions as to the extent of chemical and physical differences await additional chemical and physical evidence, not readily obtainable with the milligrams of material available.

The chromatograms given above record respectively the presence of 4, 3, 3, 3, 3, 5, and 3 chromatographically distinct zones, depending upon the lignin preparation and the solvent employed. Typical examples of chromatograms are illustrated in Figures 2 to 5, inclusive.

The quantity of material present in these chromatograms was small. Two drops of a 5 per cent solution of lignin were commonly used to form the original spot, representing approximately 5 mg of lignin. Purely for the purposes of estimation, if one were to assume that division into three chromatographically distinct zones were on the basis of equal weight of lignin portions, then the quantity of the lignin portion in a single zone would be of the order of 1 to 2 mg. If divided into more than three bands and with the unequal weight division which might be expected, the minimum weight of material in a single zone would probably fall in the microgram range.

All of the chromatograms mentioned here have been duplicated. Blank determinations were made with all the solvents investigated, the solvent alone being applied to the paper. A few of these caused a permanent change in the fluorescence of the cellulose, even after evaporation of the solvent, perhaps by a masking action, perhaps by formation of a complex with the cellulose, and were eliminated from consideration. Cinnamyl aldehyde, morpholine, isophorone, and 2-amino-1-butanol are examples of such solvents.

That adsorption was the phenomenon responsible for the separation into chromatographically distinct zones was shown by the following experiment. When Lignin A was chromatographed according to the procedure outlined above, with 10 per cent (by volume) of methanol in anhydrous butanol as the solvent, but substituting glass cloth (previously heated at 500 to 600 C for five minutes), it separated into two portions in a typical extraction pattern *(1)*. Figure 6 is a photograph of such a pattern. The two portions appeared to be identical in both visible and ultraviolet light, neither showing any fluorescence. The wide difference in this result from that obtained with a paper adsorbent is shown by reference to Chromatogram 1 and Figure 3. When the two portions which were separated by extraction on glass cloth were compared as to diffusion rates by the method already described *(1)*, the outer portion had a diffusion mobility approximately 70 per cent greater than that of the central spot.

The optical properties of the material available in the various zones precluded direct visual comparison of diffusion mobilities while the extremely small quantities of material available rendered ineffectual or of doubtful value the measurement of the customary chemical constants as tests of difference. The development of methods for the preparation of larger quantities of material together with the utilization of searching and critical technics for the investigation of molecular structures seems to be indicated.

Partition chromatography *(2)* was applied to Lignin A, with the paper in equilibrium with a water-saturated atmosphere at room temperature, using butanol as the solvent. The chromatogram is shown in Figure 7, and illustrates the superiority of partition chromatography over extraction. The latter separated the lignin into two portions having different properties, but partition chromatography showed, in addition, that the outer ring of material

extracted by butanol was chromatographically heterogeneous. Partition chromatography of lignin on cellulose presents a complex condition, since the influences of adsorption and partition probably conflict with results which can not be easily predicted. The differences between Figures 3 and 7 indicate that lignin is susceptible to both adsorption chromatography and partition chromatography and emphasize the importance of further study of partition chromatography freed from the effects of adsorption.

Discussion

It has not appeared possible to avoid the conclusion that a zone which exhibited abnormal absorption of light or fluorescence, other than that of the cellulose or solvent, contained some material derived from the lignin. Considerable differences in flourescence and absorption of light were apparent, as is indicated in the above chromatograms. Lignin A, with a butanol-methanol solvent, for example, contained two portions which were both invisible in the occurring concentration in visible light but which were both visible and distinctively so in ultraviolet light, one exhibiting white fluorescence, and the other yellow fluorescence. Other portions had distinctive appearances in both ultraviolet and visible light. In general, solvents which effected separation into chromatographically distinct portions gave rise to fluorescence. The reverse was also generally true. Solvents such as pyridine, dioxane, and glacial acetic acid caused only general spreading. Considerable difference in the chromatographic heterogeneity of a single lignin preparation was exhibited under the influence of different solvents. It perhaps should be noted that the lignin remaining in the central spot may have been merely insoluble in the particular solvent and was not necessarily held by adsorption.

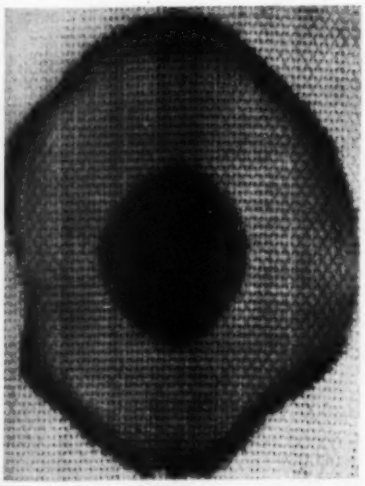

Fig. 6—Photograph of extraction pattern of Lignin A, with butanol-methanol (9:1) solvent, on glass cloth support. Photographed by "transmitted" ultraviolet light with K2 filter. Compare with Figure 3

Among the questions raised by the above experiments are: (1) whether all of these various portions isolated with different solvents are chromatographically distinct from each other, (2) whether the fluorescence was influenced by the last solvent with which the lignin portion was in contact, (3) whether contact with the cellulose changed the fluorescence or the light absorption of the lignin portion, i.e. was a lignin-cellulose complex formed which had different properties than either of the parent materials, (4) whether similarity in fluorescence and light absorption is indicative of chemical and physical similarity, (5) whether dissimilarity in fluorescence and light absorption indicates dissimilarity in chemical structure or physical state, and (6) what is the relationship of the structure of the solvent to the number and character of the lignin portions? Whatever the answers to these questions may be, extensive and exacting experiments seem to be required to provide data which may contribute importantly to an understanding of lignin composition.

The use of chromatographic methods on a cellulose sheet support offers a new and discerning means of comparing lignin preparations and reaction products, providing analytical data on the chromatographic homogeneity or heterogeneity of materials both before and after treatment, on lignin materials of different botanical origin, of different chemical history, and the like. The sheet method offers the advantage of being easily and readily capable of comparing milligrams of sample material, of utilizing the technic of mixed chromatograms, and of studying lignin portions, some perhaps as yet unknown, by combining lignin in complexes which can be resolved by adsorption. The sheet method should be a particularly serviceable analytical tool for a rapid and simple, yet accurate, test of identity, homogeneity, and heterogeneity. There has been no comparable test available in the past.

The separation of lignin preparations into chromatographically distinct portions is suggestive. While a cursory search of the literature failed to disclose a categorical statement that chromatographic heterogeneity is positive proof of chemical difference, this condition is generally true. Strain (*8*, p. 12) noted that the identity or nonidentity of two preparations may be established by mixing their solutions and chromatographing; under these conditions the formation of a single zone establishes identity, and the formation of two zones establishes that they are not identical. If future experiments demonstrate (as it appears likely they will) that these lignin portions are physically or chemically distinct, then much of the literature dealing with the constitution of lignin will probably have to be rewritten. Extension of these experiments may ultimately make clear that studies of lignin composition—the state of being a composite substance—may have been bypassed in favor of studies of lignin constitution—the chemical structure. If this concept is verified, then lignin investigators will have to go back and discover the secrets of lignin composition before proceeding to the study of the chemical constitution of each of the components of a given lignin-system. Judging by the last thirty years of difficult progress in lignin constitution, the long way around may yet be the shorter.

Fig. 7—Photograph of partition chromatogram of Lignin A, butanol solvent. Photographed by "transmitted" ultraviolet light with K2 filter. Compare with adsorption chromatogram shown in Figure 3

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Neutral Sulphite Semichemical Pulping Process

HENRY J. PERRY, Consultant

Henry J. Perry, Registered Professional Engineer, recently opened his own consulting office in New York City after nearly 25 years of active participation in the pulp and paper industry. He has been associated with such firms as Arthur D. Little Inc., J. P. Lewis Co. and Latex Fibre Industries, and with Frederic C. Clark Associates. For a number of years he has been an active member of TAPPI and the Canadian Pulp and Paper Association. He also has been associated with other professional societies. This is one of a series of lectures in the Pulp and Paper Technology and Equipment Course at the University of Maine.

▶▶▶ BEFORE CONSIDERING the neutral sulphite semichemical process, the problem of all chemical pulp makers should be examined regardless of the reagents that they use—this problem is to make a pulp most suitable for the grade of paper required. Generally, the characteristics required are high strength, suitable optical properties, light color, high brightness, and superior printability. Economically, these must be obtained with a minimum amount of steam, chemicals, and labor to give a maximum yield.

Just how well is this done considering what is known and the materials available? The conventional processes are considered satisfactory in spite of the fact that only 40 to 50 per cent of the wood delivered to the digesters is utilized. Can it be improved? Certainly it can and must. What are the future possibilities, assuming that it is the whole holocellulose fraction which papermakers want, and there is more evidence accumulating every day that it is this fraction in the lower as well as the higher form which can make good paper? For example, examine the analysis of two representative species.

	Holocellulose	Lignin
White spruce	73%	27%
Quaking Aspen	82%	17%

Comparing this possible amount with present commercial yields of 40 to 50 per cent, it can easily be seen that there is room for considerabie improvement. Unfortunately, no pulping process is selective enough in its solvent power, for all commonly used methods remove not only lignin but also a large amount of holocellulose at the same time.

This is the challenge to all wood and pulp technologists: How can the yield be increased and still give all the properties that papermakers want and need?

The topic under discussion is a step in this direction. What is the neutral sulphite semichemical process, how was it developed, how does it work, and what are its possibilities?

Essentially, the neutral sulphite pulping process consists of cooking wood or other cellulosic materials with sodium sulphite buffered with sodium bicarbonate or carbonate.

The use of sodium sulphite is not new, having been advocated by Cross in 1880. From that time until about 1920, several investigators worked with this reagent and the process of using it. Several modifications were developed and promoted under the trade names *Keebra* and *Sodite*. One or two mills used these patented methods for a few years before they were abandoned, probably because of chemical recovery problems.

U. S. Forest Products Laboratory started an investigation in the 20's which became a major project, and great credit must be given to it for the advancement of the process. The first application of the Laboratory's developments and improvements was in 1926 when the process was used to pulp spent chestnut chips from tannin extraction plants. This pulp was and is used for 9-point corrugating board. From this modest beginning there has been an increase to an annual tonnage of about 325,000 in 1947.

The basic procedure worked out by the Forest Products Laboratory differed from that of other investigators. The laboratory developed the technique of impregnating the chips with the liquor and blowing back the excess to storage for reuse instead of using a full conventional cook. The chips were softened and the fiberization was completed by mechanical means. Rod mills were used in the early days but have now been supplanted by attrition mills.

The variations should be defined before proceeding. The neutral sulphite semichemical pulping process pertains to the cooking method in which sodium sulphite, buffered by either bicarbonate or carbonate, is used as the active reagent at practically a neutral *p*H. Semichemical refers to a high yield process where mild chemical cooking conditions prevail. This innovation started a trend of pulping so that there is now semichemical sulphate, acid sulphite, and neutral sulphite. In the process the chips are merely softened and mechanical treatment is required to complete the pulping.

This introduces the specific process as it is being used in several mills with considerable success. Yields range from 10 to 40 per cent higher than the more conventional methods, strengths are equal in some cases to commercial pulps, and beating time is generally lower. When the pulp is bleached, the chlorine consumed is high but the additional yield should more than pay for this increase.

After many years of work it has been well established that the process is best adapted to deciduous woods, and to some of the grasses such as wheat and

flax straws. Douglas fir appears to be the one exception among the coniferous species with which the process works well. There is no doubt that as the supply of preferred species decline the method will assume an increasingly important place within the pulp and paper industry.

Details of Process

Liquor Preparation—The cooking liquor being composed of sodium sulphite and either bicarbonate or carbonate is rather easy to prepare. Various conditions dictate whether the chemicals will be made or purchased. Sodium sulphite is available as a by-product from phenol manufacture and the price is reasonable when purchased in large quantities. In cases where it is purchased, soda ash is used as the buffer.

Where it is desired to make the cooking liquor, sulphur and soda ash are purchased. The system will then require soda ash dissolving tanks, agitators and pumps, a sulphur burner, combustion chamber, and absorption tower.

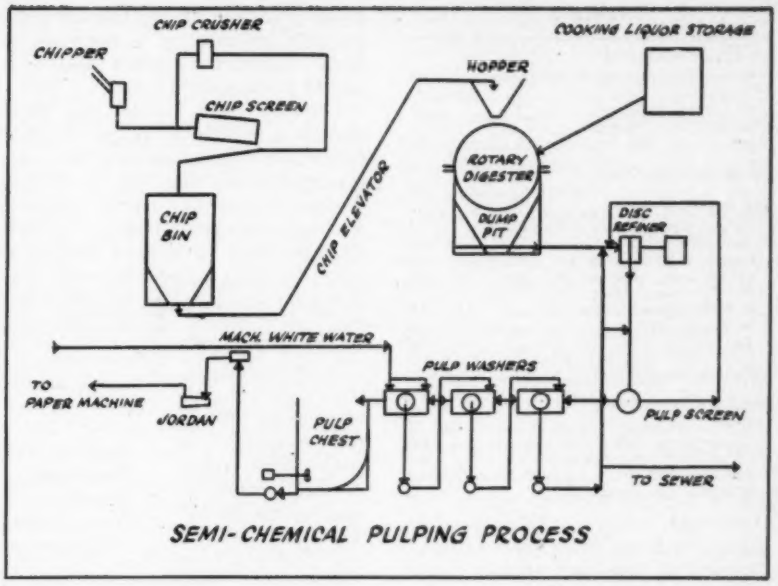
The soda ash is put in solution and circulated from top to bottom of the tower, the burner started, and the sulphiting carried on until the required concentration of Na_2SO_3 is produced. During the reaction the SO_2 replaces the CO_2 which in turn combines with more soda ash converting it to bicarbonate, the excess CO_2 escaping from the top of the tower. The process can be either continuous or batchwise.

It should be noted that no gas cooler is necessary as is the case in the acid process and that burner efficiency is also not as important.

The liquor leaving the tower, of course, is hot and saves steam later on in much the same way as the hot acid system does. It is also the generally accepted practice to make up a concentrated solution and dilute upon use.

There appears to be little difference in the end produce regardless of whether the carbonate or the bicarbonate is used. Some woods are reported to produce a slightly brighter pulp with the bicarbonate buffer.

As an example of the concentrations used, a standard soda solution is made up containing 8000 lb. of soda to 500 cu ft of water at a temperature of 140 Fahr. For a low ration liquor (4 to 1), sulphiting is stopped when for each 100 lb of soda ash there is produced 80 lb Na_2SO_3 and 20 lb $NaHCO_3$. This will require 24.3 lb of sulphur. For a high ratio liquor (7 to 1); for each 100 lb of soda ash there would be 87.5 lb Na_2SO_3 and 12.5 lb $NaHCO_3$ requiring 26.4 lb of sulphur.



SEMI-CHEMICAL PULPING PROCESS

Cooking Procedures

There are two procedures in current use today depending on the grade of pulp required.

The Impregnation Method—This method is used for the higher grades of pulp, especially for those that are to be bleached. The chips are charged to the digester and steamed at atmospheric pressure for ½ hour after which the liquor is added. The temperature is raised to 120 C and the chips are thoroughly impregnated. The time required is about 1 hour for most woods, the temperature being held between 120 and 130 C. It is during this period and within this range that most of pyroligninous acids are formed and an excess of alkali is present to neutralize it. At the end of this period the excess liquor is blown back to be refortified and reused in the succeeding cooks. Cooking then proceeds with only the liquor contained in the chips plus a slight excess required for basting purposes. The temperature is raised rapidly to 170 C for the actual cooking period.

As an example of the absorption, using a liquor with a 4 to 1 ratio containing 10.8 lb Na_2CO_3 per cu ft, aspen will absorb approximately 12.5 per cent sulphite and 4.2 per cent bicarbonate, a total of 16.7 per cent total chemical.

If a rotary globe digester is used it will be given a roll every five minutes for beating and mixing. If a vertical di-

TABLE 1

Wood	(Board) Mixed Hardwood	(Bleached) Aspen
Time		
Steaming	None	½ hr
Impregnation	None	1 hr
To pressure	1 hr	1 hr
At pressure	2½ hr	2½ hr
Total processing	3½ hr	5 hr
Chemicals		
Ratio	7 to 1	4 to 1
Na_2SO_3	87.5 per cent	80 per cent
$NaHCO_3$	12.5 per cent	20 per cent
Concentration as Na_2CO_3	8 lb per cu ft	10.8 lb per cu ft
Chemicals Absorbed		
Na_2SO_3 as Na_2CO_3	10.5 per cent	12.5 per cent
$NaHCO_3$ as Na_2CO_3	1.5 per cent	4.2 per cent
Total	12.0 per cent	16.7 per cent
Liquor to wood ratio	2½ to 1	1.8 to 1
Cooking End Point as Na_2CO_3	0.26 lb per cu ft	0.46 lb per cu ft
Chemical Consumption	96.8 per cent	95.8 per cent
pH about	7.2	7.2
Yield, unbleached	80.0 per cent	69.3 per cent
Lignin	—	8.3 per cent
Freeness, S.R.	830	820
Chlorine No.	—	14.5
Power requirement	15.6 hp days	16.2 hp days

TABLE 2

1st Stage Chlorination	
Consistency, per cent moisture-free	3
Temperature, Fahr.	75
Cl consumed, per cent	15
Reaction time, hours	2
*p*H	1.2
(Wash between stages)	
2nd Stage Extraction	
Consistency, per cent moisture-free	6
Temperature, Fahr.	120
Caustic soda, per cent	2.0
Caustic soda consumed, per cent	1.9
Reaction time, hours	2
Sodium sulphite added, per cent	0.5
Maximum *p*H	11.0
End *p*H	9.0
(Wash between stages)	
3rd Stage Hypochlorite	
Consistency, per cent	6
Temperature, Fahr.	100
Cl as bleach, per cent	0.5
*p*H controlled to	8.0-8.5
Reaction time, hours	2
(Final wash)	
Summary	
Chlorine No. unbleached, per cent	14.5
Chlorine consumed, per cent	15.5
Lignin per cent unbleached	8.3
Yield unbleached, per cent	69.3
Yield bleached, per cent	58.8
G. E. brightness	85
Wood	aspen
Pulp per cord, lb unbleached	1300
Pulp per cord, lb. bleached	1100
Wood weight per cord, lb. barked	1912
Freeness bleached, S.R. cc	780

gester is used, pumping the excess liquor from the bottom to the top is necessary.

Board Technique—The wood and proper amount of liquor are charged into the digester, the cover is bolted on, and steam admitted. Temperature is brought up as rapidly as possible, generally taking about 1 hour. It is necessary during this period to frequently relieve the air and inert gas to get the temperature up to the required 170 C.

As this procedure is used principally for boards, cooking is not carried on as completely as with the higher types of pulp. Chemical concentration is usually lower and the ratio of liquor to wood is higher. Lignin removal is not important in this grade.

The cooking time at pressure varies according to the wood; usually the period is from 1 to 3 hours with 2½ hours as the average. The digester must be blown down and then dumped. Here again is another difference from the conventional; because of the low liquor ratios and the fact that the chips are only softened, it is necessary to dump or flush the digester clean as it cannot be blown.

Common sense dictates that there shall be a suitable pit or bin installed under each digester and that the sides be sloped so that the chips will feed to a conveyor. Some people advocate leaching at this point, however this will cool the chips. It is good practice to keep the chips as hot as possible as they refine much more easily the hotter they are. Excess liquor, however, should be drained away.

After draining, the chips are conveyed to the refiners for reduction to pulp. The refiners most commonly used are the Sprout Waldron, Bauer, and Claflin. A high consistency is preferable to minimize cutting and breaking the fibers.

The refined stock is then diluted for screening in rotary screens, the accepted stock going to the washers, the rejected stock being returned to the refiners for further treatment. The use of vacuum washers is desirable. The wash water should be hot and can be heated by the blown down steam from the digesters. If clean white water is available, it should be used for this purpose. It is well to remember that screening and washing equipment has only about 40 per cent of capacity when compared to long fibered stock.

A direct comparison between the two methods is shown in Table 1.

Recovery

To date there have been several attempts to develop a satisfactory recovery process but so far little has been accomplished. The principal difficulty is that the sulphur compounds oxidize to sulphate and then reduce to sulphides, the resulting white liquor, therefore, becomes a regular kraft liquor and the process is sulphate instead of neutral sulphite. This reaction, of course, is ideal if the NSSC pulp mill is connected with a kraft mill as the same unit is used for recovery and the sulphite black liquor replaces the lost salt cake.

It is believed possible to set up a recovery unit in which all of the sulphur compounds can be burned out leaving Na_2CO_3 as the end product which of course would be perfect. It is believed that this might also add the further complication of producing obnoxious odors from which the process is now free. Recovery is desirable to lower the chemical costs which are higher than for the sulphate process and to prevent stream pollution. However, from a heat value standpoint, recovery is not as advantageous as it is for sulphate. The following table shows a comparison between the two processes.

	N.S.S.C.	Sulphate
Liquor to evaporator	200-395 gal.	1500-2000 gal
Total solids	5-15 per cent	15-20 per cent
Heat value	6065 Btu	6560 Btu
Total heat	1,150,000 Btu	16,000,000 Btu

From this tabulation it can be seen that there is little chance for a bonus in additional steam and power generated as in the normal sulphate recovery system. What steam can be generated would probably be required for evaporation.

Bleaching

Most of the species cooked are considerably duller and browner than normal sulphite and it is necessary to semi-bleach in order to raise the brightness to commercially accepted standards for light colored papers. Blends can be made from NSSC and soft and hardwood groundwoods which do match newsprint for color. The unbleached pulps are suitable for liner, corrugating boards and as extenders for kraft. Fully bleached pulps can be used for glassine, grease-proof, bonds, coating stock, and waxing grades.

It is preferable to use a multistage system. Typical conditions as an example are shown in Table 2.

For semibleaching to brightness values of 55 to 65, two stages of hypochlorite are sufficient and result in a shrinkage of about 8 per cent.

Pulp Quality

The NSSC pulp, being of hardwood origin, has a short fiber, a condition which cannot be helped. The short fiber is generally slower, and of course closes up the sheet. It differs from other pulps in having a high holocellulose content; due to this fact it hydrates more rapidly and develops maximum strength more quickly.

Bleaching very definitely increases the strength as well as the rate of slowness. As an example, a beating test (Table 3) shows these results.

TABLE 3

	Unbleached	Bleached
Beating time, min.	35	20
Freeness, S.R. initial	18	23
Freeness, S.R. final	35	36
Bursting strength, per cent	137	147
Tear	0.79	1.09
Tensile, kg.	9.0	8.3
Fold, double	600	550

TABLE 4

	Aspen		Birch	
	Burst	Tear	Burst	Tear
NSSC, bleached	110	105	—	—
Sulphate, unbleached	90	75	110	90
NSSC, unbleached	80	85	75	70
Sulphate, bleached	80	90	85	90
Soda, unbleached	65	75	—	—
Soda, bleached	50	60	—	—
Sulphite, unbleached	50	60	75	90
Unbleached spruce sulphite =	100			

Data show that of all methods of cooking hardwood the NSSC process is superior to any other; aspen can be cooked to equal spruce sulphite in burst and tensile, but as is expected is inferior in tear. It is, of course, inferior in all characteristics to northern spruce kraft. The same facts are true in regard to bleached pulps.

The Forest Products Laboratory after many tests has released a set of comparisons between aspen and birch cooked by all known methods and unbleached spruce sulphite (Table 4).

These results have been confirmed by other investigators as well as by practical experience.

If the analyses were available it would be seen that the lower forms of holocellulose have been removed from the sulphite pulp. The effect of this constituent of wood is noticeable in other ways beside strength and rapidity of beating. It gives rattle to the sheet, decreases the opacity, and increases the transparency in unfilled papers. There is some evidence that it helps to retain fillers, giving a greater opacity on filled sheets than is normally expected.

From the comparison of NSSC and other methods of pulping, the conclusion can be drawn that NSSC does not dissolve the naturally occurring hydration or the gel which develops during stock preparation, and with the use of this method it is available for sale as paper and not dumped down the river as heretofore.

Economic Considerations

Capital Costs—It is estimated that at today's prices the equipment for a mill to make unbleached

NSSC will cost about $25,000 to $35,000 per ton day

Sulphate will cost about $35,000 to $45,000 per ton day

Sulphite will cost about $35,000 to $45,000 per ton day

A further factor to be considered is that a NSSC plant without a recovery unit is economically sound with a capacity of about 40 to 50 tons per day, while a sulphate mill would have to have a capacity of about 80 tons.

Wood Costs — Hardwood being in lesser demand than spruce, the cost per cord is generally lower and certainly the wood is more abundant. Still another factor is the higher yield per cord.

Conversion Costs—As for the conversion costs, the chemicals are higher than for other methods, the bleaching cost is also higher, and steam costs are lower. The increased yield and lower wood costs will probably make up for these increases and so it is, therefore, reasonable to assume that the finished NSSC pulp will not cost more than that of spruce pulps and it may be lower in some areas.

Conclusion

The NSSC process is assuming an important place in the industry and will continue to grow as the use of hardwoods becomes increasingly necessary.

Unbleached pulps are suitable for coarse papers and boards, and they contribute valuable properties to these products.

Bleached pulps of excellent color and other qualities can and are being used in glassine, bonds, white lined boards and printing papers.

Rarely will these pulps be used alone, however, their use in blends will extend the supply of long fibers secured from the scarce coniferous species. The following example is an indication of developments that can be achieved.

An experimental run has been made with the unorthodox furnish of: birch NSSC 35 per cent, birch groundwood 20 per cent and jack pine groundwood 45 per cent. The quality compares very favorably to that of commercial newsprint except the oil absorption which can be corrected.

From the price standpoint, the pulps can be made at equal cost to those of competitive pulps even though some components and steps are more expensive.

Acknowledgment — The author wishes to express his appreciation for the valuable assistance given by John McGovern, Gardiner Chidester, and Morris Phelps whose work has supplied a great portion of this paper.

The French Paper Industry Today

(Continued from page 204)

erally, the consumer's market for all types of converted papers and boards is much more limited in France than in the States, since the French people are not as paper-conscious as the Americans.

Modernization Programs

Since the Liberation, a wonderful effort has been made by the leading paper and board companies to make up for the delay in the modernization program, caused by the war. Before the war, the management was reluctant to modernize equipment in the mills, due to the fact that it was frequently more economical in France to have an excess of operating personnel than to purchase more efficient equipment.

However, the recent sharp increase in wages and general improvement of the economic situation have brought about a growth of the need for modern equipment and the first steps have already been taken toward importation of American and also Swedish equipment.

The first paper machine manufactured in France since the Liberation is presently being erected in Algeria in an entirely new paper mill. Esparto fibrous raw material will be employed and facilities for bleaching are being incorporated. This paper machine is of the fourdriner type and has the latest improvements.

Elsewhere, stock preparation systems have been completely modernized, incorporating new equipment such as Hydrapulpers and complementary machinery. Some paper machines, manufactured in Germany and in the States, are presently on order or being installed.

The more important advance will be the enlargement of the straw pulp production in an attempt to expand the utilization of the natural resources. New bleaching plants, using the Pomilio process, will shortly enhance the availability of bleached straw pulp.

The field of hardwood pulping is also receiving a great deal of attention since the French forests are far richer in hardwood than in softwood.

All these improvements play a part in fulfilling the hopes of the French paper industry to ever increase the production and become more self-sufficient, with the eventual goal of a complete healing of the war wounds.

PAPER SKETCHES

Peddlers OF THE 19th CENTURY LEARNED THEY COULD EXTRACT MORE OLD RAGS FOR PAPERMAKING FROM HOUSEWIVES BY GIVING THEM BRIGHT, SHINY TINWARE THAN BY OFFERING THEM CASH.

PAPYRUS CAN BE TRACED BACK AT LEAST TO 3600 B.C. WHEN IT WAS USED TO KEEP ACCOUNTS IN EGYPT DURING THE REIGN OF THE PHARAOH, ASSA.

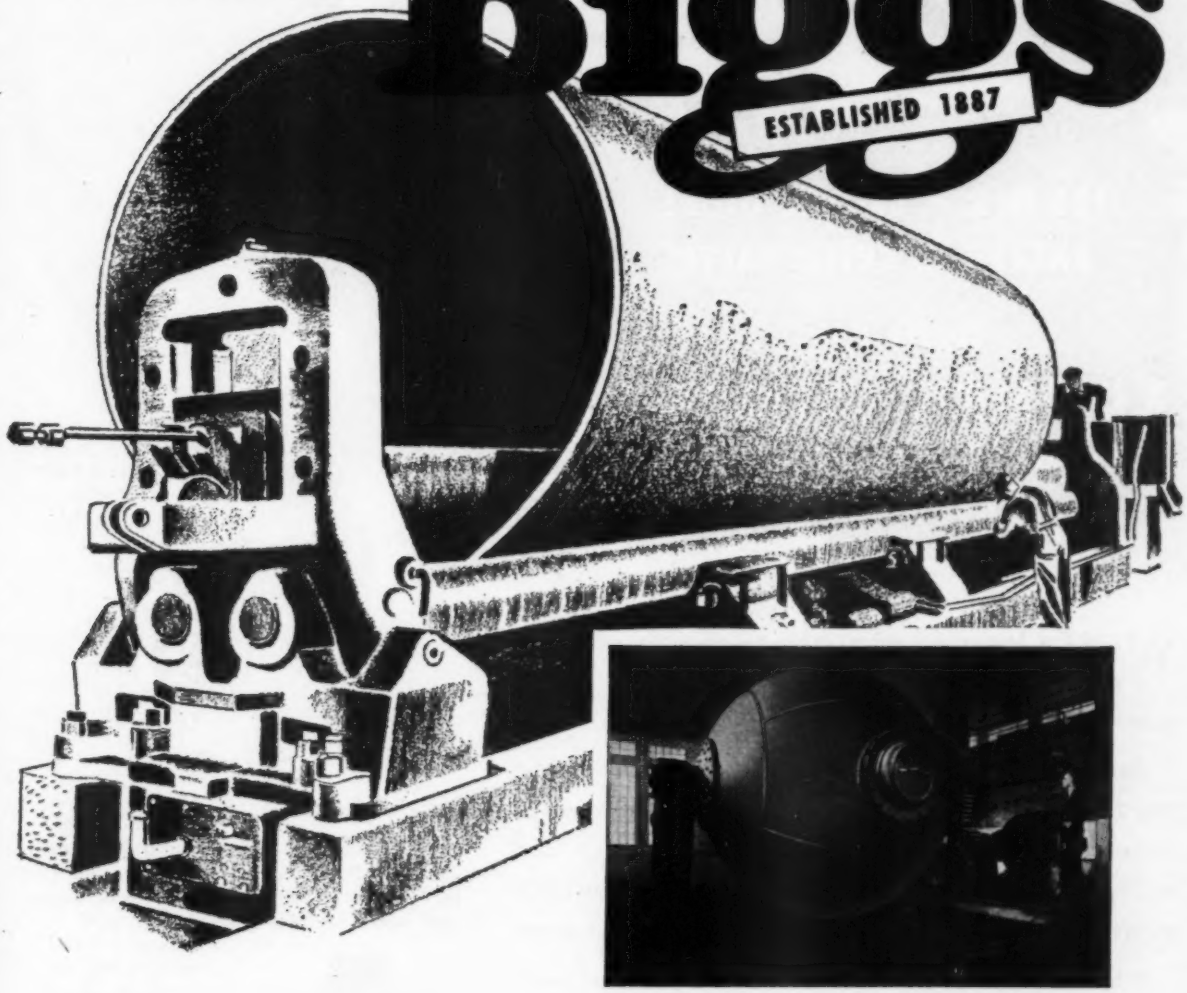
A NEW TYPE HAT — LOOKING LIKE A PANAMA — IS BEING MADE EXPERIMENTALLY OF A WATER REPELLENT CREAM COLORED KRAFTCORD PAPER

FIRST AMERICAN NEWSPAPER TO USE WOOD PULP PAPER USUALLY ALTERNATED IT WITH RAG PAPER; SOMETIMES USING SHEETS OF EACH IN THE SAME ISSUE, SOMETIMES TRYING ONE KIND FOR SEVERAL DAYS, THEN SWITCHING TO THE OTHER; SOMETIMES MIXING THE TWO PULPS IN THE SAME SHEET OF PAPER

HEAVY PLATE FABRICATORS FOR INDUSTRY

. . . that's Biggs

ESTABLISHED 1887



BIGGS MADE . . . 10-ton welded rotary digester

PRESSURE VESSELS TO MEET EVERY REQUIREMENT

The Biggs Boiler Works Co. Akron Ohio U.S.A. Est. 1887

PRODUCTS BY BIGGS WELDED TO CODE REQUIREMENTS

CARBON STEEL • SPECIAL STEEL SPECIAL ALLOYS and CLAD METALS

The pulp and paper industries rely on equipment "built by Biggs". This is a logical outcome of our half-century of specialized experience in heavy plate assemblies, and our progressive research in fabricating with Nickel, Monel, Inconel, Stainless Steel, as well as all clad metals — to lengthen life of equipment and safeguard products.

Biggs' modern and complete plant facilities and long technical experience are yours to command or consult . . . Simply write, phone or wire the Akron Office. Our field representative will call to discuss your problem of fabrication for your requirements.

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THE BIGGS BOILER WORKS COMPANY • 1015 Bank Street, Akron 5, Ohio

NOW...

...125 lb. S. P. BRONZE GLOBE, ANGLE and CHECK VALVES

Built to

LUNKENHEIMER QUALITY STANDARDS

Fig. 2140 GLOBE
125 lb. S. P.
200 lb. W.O.G.

WANT a lower pressure valve to give the same dependable, low-cost service you get in higher pressure LUNKENHEIMER Valves?

Here it is—New Fig. 2140 globe; Fig. 2141 angle; Fig. 2142 lift check; Fig. 2144 swing check. These valves feature Lunkenheimer's traditionally fine design and sturdy construction, plus exclusive silicon bronze alloy stems which eliminate stem thread failure due to wear.

Whatever your requirements for lower pressure service, you'll find these new valves unequalled for dependability and true economy.

Full details, including illustrations and dimensions, are given in Circular No. 582. Ask your Lunkenheimer Distributor for it or write direct.

ESTABLISHED 1862

THE LUNKENHEIMER CO.

"QUALITY"

CINCINNATI 14, OHIO. U. S. A.

NEW YORK 13 CHICAGO 6 BOSTON 10 PHILADELPHIA 34
EXPORT DEPT. 318-322 HUDSON ST., NEW YORK 13, N. Y.

Your Lunkenheimer Distributor is stocking these new 125 lb. S.P. Bronze Valves. Call upon him for your original equipment, replacement and repair valve requirements.

Fig. 2142 LIFT CHECK
125 lb. S.P. 200 lb. W.O.G.

Nowhere in the line is dependability more important than in Check Valves. These Checks function quickly and positively, seat accurately and tightly.

Fig. 2141 ANGLE
125 lb. S.P. 200 lb. W.O.G.

Fig. 2144 SWING CHECK
125 lb. S.P. 200 lb. W.O.G.

Current Comment . . .

The opinions expressed here are from a commentator close to the industry, who, in the past, has interpreted briefly the trends of the paper industry. His comments, which hereafter will appear at greater length than before, and in broader scope, are based entirely on economic and financial facts that emanate regularly from sources that speak with authority.

BUSINESS SHOWS RESISTANCE BUT SEES "NO SHOALS AHEAD"

▶▶▶ WHILE ALL BUSINESS has definitely fallen off in the first months of 1949—and the paper industry is no exception—fears of a depression or even a serious recession are being dissipated by developments. All signs point to steadily maintained business for months to come, but at a level well below the boom months of the preceding two years.

The various reports of temporary shutdowns of mills in various parts of the country should not be taken to indicate anything more than a normal course after the unprecedented production records of previous months. There is still no reason to believe that 1949 consumption will be greatly below that of 1948. As a matter of fact, paper mills have been operating in many cases for seven days a week, and after such prolonged operation maintenance problems have been becoming acute. Some students of business conditions believe that business already has been stabilized and that the future may see an upturn rather than any further recession.

While there are still depressing factors, particularly in the Washington legislative field, they are not apparently such as to indicate shoals ahead. Business generally is displaying noteworthy resistance to the forces making for a decline.

Reports of paper mill earnings for the first quarter of the year are beginning to come in, and almost universally show declines from the profits of the same quarter in 1948, but this was to be expected. Some shaking out of weak companies can be expected, with the low cost mills having a material edge over the higher cost converting mills as paper prices show signs of pressure. However, the increasing development of new converted products seems to be serving to cushion the impact of consumer demands for lower prices.

Production of paper for the year to date has been on a basis of under 92 per cent of rated capacity as compared with a 1948 over-all average of 100.5 per cent. The drop in the paperboard field is greater than in the paper industry, operations for the year to date being 79 per cent of capacity, as compared with 102 per cent for the first quarter of 1948.

As a result of the filling of inventories by consumers and a somewhat reduced demand, some paperboard mills in the South have curtailed operations, but, on the other hand, mills in the fine paper area have come back to a higher level of operation than was the case a few weeks ago.

▶▶▶ The stock market is generally considered to be a good barometer of business. Securities quotations have been sliding off, but have experienced no panic slump. There is definitely an underlying strength due to such factors as the reasonable prices compared with dividend payments, and the conservatism shown in distribution of previous earnings which makes it possible for the companies to continue paying the regular dividend rates in the face of declining profits. An added strength is in the small amount of stock which is being carried on margins. All in all, Wall Street seems to feel that 1949 will be a relatively good year, even though earnings decline from the record level of 1948.

▶▶▶ Washington administered another blow to industry on April 25 when the Supreme Court again sustained the Federal Trade Commission in its efforts to destroy basing point pricing. The latest decision leaves the Federal Trade Commission free to ban the use of basing points without any attempt to prove collusion in pricing of all commodities. This policy would, as shown by industry testimony at Washington, work havoc in the paper industry and leave the market in a state of chaos. This second decision emphasizes the need for passage of the pending legislation which would restrict the utilization of the Commission's new economy theory.

LOW PRICED IMPORTS FORM RECIPROCAL TRADE BARRIER

Dribbles of news from Annecy, France, tell of efforts being made to adjust tariff rates in the new series of reciprocal trade negotiations. Comments from foreign correspondents indicate that the Marshall Plan is leading foreign nations to enter into reciprocal agreements for trade which leave the United States on the outside looking in. In short, these agreements between the western powers are serving as a Maginot line against imports from the dollar countries, pricipally the United States and Canada, while this country is progressively lowering its barriers against admission of foreign merchandise. Canada is more vociferous in its protests against this discrimination than the United States, even though Canada is conceding less in the way of duty reductions than this country.

The plan to force through the International Trade Organization Charter, which will be under way in Congress shortly, will still further open United States doors to low priced foreign merchandise. Japan is already coming into the United States market with extensive shipments of low priced textiles. On the other hand, the American Military Government's efforts to encourage the American purchase of goods from its zone in Germany has been a lamentable failure. The big exposition of German goods in New York was what the theater world calls a "turkey."

▼

FINANCIAL

▶▶▶ PAPER MILL securities dropped in value during April with the general trend of stock market prices. It is notable, however, that with the falling prices, sales dropped off in volume, and the current stock market quotations show a smaller than usual number of actual transactions.

American Box Board Company—Net income for 1948 was $1,583,337, as compared with $1,744,304 in 1947.

Camp Manufacturing Company—Net income in 1948 was $2,805,289 as compared with $2,791,797 in 1947.

Consolidated Water Power & Paper Company—Net income in 1948 was $4,141,306 as compared with $4,068,559 in 1947.

Container Corporation—Net income for the first quarter of 1949 was $1,974,313 as compared with $2,112,830 a year ago.

Robert Gair Company—Net income for the first quarter of 1949 was $1,056,585 as compared with $1,393,290 a year ago.

Great Northern Paper Company—Net income for 1948 was $4,620,512 as compared with $4,458,612 in 1947.

Hammermill Paper Company—Net income for 1948 was $1,402,072 as compared with $1,467,511 a year ago.

Hollingsworth & Whitney Company—Net earnings for three months ended March 31 were $785,387 as compared with $910,234 in the same quarter of 1948.

Kalamazoo Vegetable Parchment Company—Net earnings in 1948 were $2,668,181 as compared with $2,180,142 in 1947.

Mead Corporation—Net income for the first quarter was $947,570 as compared with $1,127,332 in 1948.

Minnesota & Ontario Paper Company—Net earnings for three months ended March 31 were $851,054 as compared with $1,500,675 for the same quarter in 1948.

Paraffine Companies, Inc.—Net income for nine months ended March 27 was $2,797,778 as compared with $2,740,543 for the same period a year ago.

Riegel Paper Corporation—Net income for 1948 was $748,374 as compared with $1,465,329 for 1947.

St. Regis Paper Company—Net income for the first quarter of 1949 was $2,205,487 as compared with $4,434,193 a year ago.

Sutherland Paper Company—Net income for three months ended March 31 was $388,323 as compared with $523,479 a year ago.

Taggart Corporation—Net income for 1948 was $885,708 as compared with $1,054,248 a year previous.

United Wallpaper, Inc.—Net income for nine months ended March 31 was $721,720 as compared with $98,340 for the same period a year ago.

Paper Mill Corporate Changes

M. S. Dowd Carton Company — The equipment of the carton company has been taken over by Robert Gair Company and will be moved to and consolidated with the Connecticut Cartons Division of the Gair Company at Montville, Connecticut.

Gaylord Container Corporation—An issue of $7,500,000 in 3 per cent notes has been arranged with the Equitable Life Insurance Company, repayment to begin April 1, 1950.

Hinde & Dauch Paper Company—The authorized capital stock has been increased from 750,000 to 1,750,000 shares, stockholders being given two of the new shares in exchange for each share of the old, and allowed to participate in the distribution of the additional 250,000 shares.

Lake Erie Pulp & Paper Company—The former Monroe Paper Company has gone out of business, and its machinery has been acquired by the Hankins Container Corporation, Cleveland.

Prairie State Paper Mills Company—This plant at Middletown, Ohio, has been absorbed into the Owens-Illinois Glass Company as part of its American Coating Mills division.

San-Nap-Pak Company — Stockholders have been asked to authorize the company to change its corporate name to Doeskin Products, Inc., because the production of tissues, etc., under this brand name represents the major portion of the company's business.

Saugerties Paper Mills, Inc.—A new name has been given by William R. Zwecker of Chicago to the consolidated company which will operate the two former Diamond Tissue Mills later known as Sheffield Paper Mills.

Worthy Paper Company Association—This old company has ceased to exist and the machinery and buildings at Agawam, Massachusetts, have been sold at auction. Labor demands were a factor in the abandonment of operations.

New York Stock Exchange—Stocks

	Closing Prices April 25	March 25
A.P.W. Products	*3¾-3⅞	*3⅝-4⅛
Celotex	19½	21⅝
Same Preferred	*17¼-17½	19
Certain-teed Products	11¼	12
Champion P & F Co.	21½	21⅝
Same Preferred	*94½-95½	*94-96
Chesapeake Corp.	*19⅝-20¼	20⅝
Container Corp.	33⅞	35
Same Preferred	*96-97⅝	*98-97
Continental Diamond	8½	8⅝
Crown Zellerbach	23⅝	23⅝
Same Preferred	97¼	*96-97
Same $4 Preferred	*94-95	*94-96
Dixie Vortex	*28¼-29	*25½-27¼
Same "A"	*51-52	*50¼-51½
Eastern Corp.	*11-11⅝	13
Robert Gair	6	6⅛
Same Preferred	*16-16⅛	16⅝
Gaylord Container	18½	19⅛
International Paper	48⅛	48⅜
Same Preferred	*96½-97⅛	*98-99
Kimberly-Clark	19⅝	20⅛
Same Preferred	99¾	*98-99
McAndrews & Forbes	*31¾-32⅛	*33½-33¾
Marathon	*19⅝-20	20⅛
Masonite	43⅛	50
Mead Corp.	*15⅝-15⅞	15⅛
Same Preferred	73⅛	76¾
Same 2nd Preferred	*104-105⅝	30⅝
National Container	⅞	7⅛
Paraffine Co.	17⅜	17¼
Same Preferred	*104-105⅝	*102⅝-103½
Rayonier	23⅛	26⅛
Same Preferred	30⅛	32⅝
Scott Paper	*50⅛-50½	*48⅝-49
Same Preferred	*93¾-95⅝	*93-95
St. Regis	7⅞	8⅛
Same Preferred	83	*82½-84
Sutherland Paper	*32⅝-33	*31¾-32¼
Union Bag & Paper	25⅝	28⅝
United Bd & Carton	*5¼-5⅜	5⅜
United Wall Paper	3⅜	3¼
U.S. Gypsum	97¼	99⅝
Same Preferred	*181¼-183¾	*179¾-181½
West Va. P & P Co.	36½	38
Same Preferred	*105-106	*105-105¾

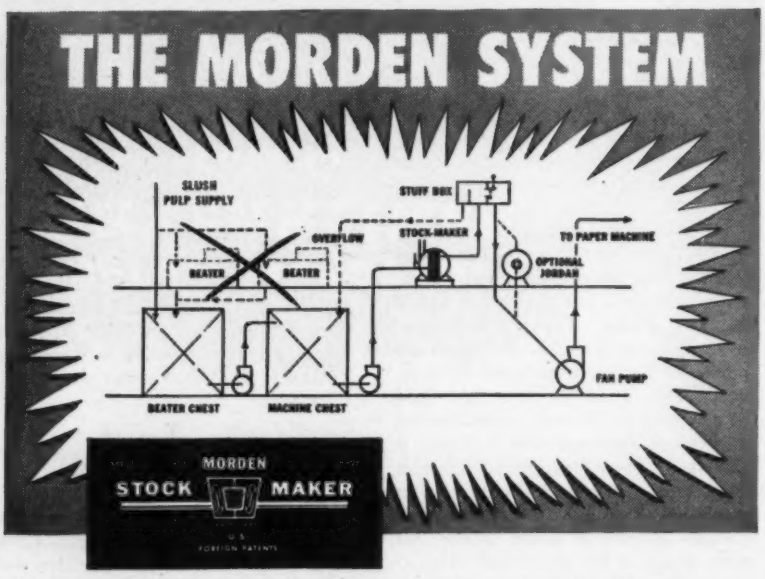
New York Stock Exchange—Bonds

A.P.W. Products 5%	—	88
Celotex 3¾%	—	101¼
Champion P & F Co. 3%	—	100½
Mead Corp. 3%	—	102½

New York Curb Exchange—Stocks

Am Writing	*5⅜-6	5¼
Great Northern	*34½-35¼	36⅛
Taggart	*10½-11⅛	—

*Bid and Asked Prices



SIMPLE • DIRECT • EFFICIENT

THE MORDEN "STOCK-MAKER" readily fits into all types of stock treatment systems.

The above diagram shows how simply it can be located in the line between the machine chest and stuff box.

"Stock-Maker's" balanced beating and refining treatment makes possible the elimination of batch treatment in beaters or the cutting tendency in jordans. One Morden can replace the treatment of two or more conventional beaters.

"Stock-Maker's" continuous, controlled treatment direct-to-the-paper-machine gives improved quality, increased production and substantial savings in space, power, labor and maintenance. Or "Stock-Makers" can be used in combination with your present equipment for additional treatment to give increased production and improved quality.

Ask Morden to outline the "Stock-Maker" system best suited to your particular requirements.

MORDEN MACHINES COMPANY
PACIFIC BUILDING • PORTLAND 4, OREGON

in Canada
The William Kennedy & Sons, Ltd. Owen Sound, Ontario

in England
Millspaugh, Limited, Sheffield

INTRODUCING RATO-CHLOR:

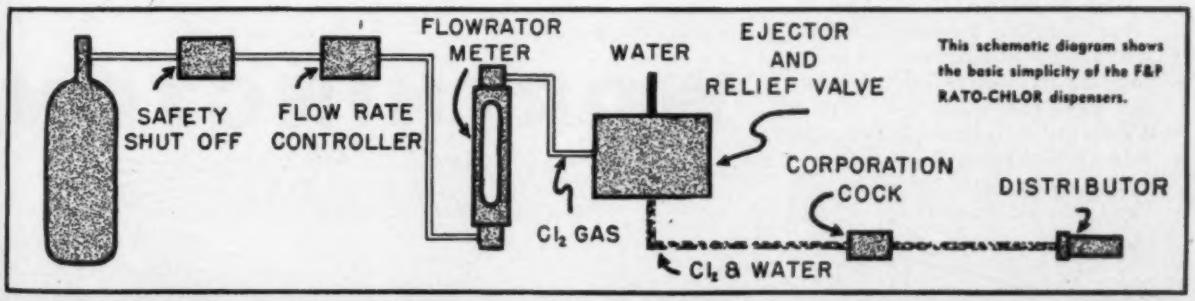
A REVOLUTIONARY CHLORINATOR PRICED BELOW $1000

Model S-1000 RATO-CHLOR Dispenser

New in every sense of the word . . . No poppet valves, no bell jars, no water seals . . . just an assembly of standard instruments! It's simple—it's inexpensive—it's versatile—it's accurate—it's compact. Maintenance costs are negligible.

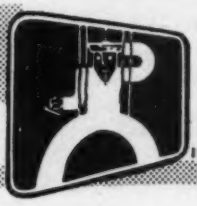
Three standard models cover every chlorine requirement—municipal, industrial, or swimming pool. Prices start at $300. Solution feed, dry gas feed, or hypochlorite for flow rates as low as 5 lbs. per day.

Be sure to get your copy of Catalog 61 which contains an illustrated description of RATO-CHLOR dispensers now used in more than 100 installations.



This schematic diagram shows the basic simplicity of the F&P RATO-CHLOR dispensers.

FLOWRATOR TRADE MARK



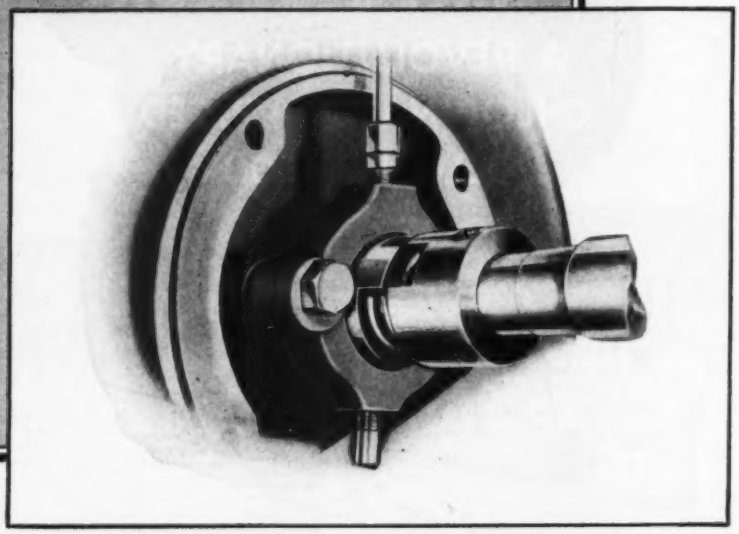
FISCHER & PORTER COMPANY

DEPT. 9Q-1F HATBORO, PA.

INSTRUMENTS FOR FLOW RATE MEASUREMENT AND AUTOMATIC FLOW CONTROL

When Packing Against CORROSIVE LIQUIDS . . .

you can depend on Worthington Worthite Pumps equipped with Type EA Mechanical Seals



Worthington Type EA Mechanical Seal for Worthite Type CG Chemical Pumps. Three sizes of seals for 23 sizes of pumps.

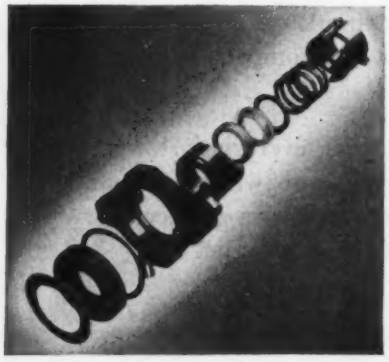
If you have been running into trouble with your stuffing boxes and packings, it's time to consider Worthington Type EA Mechanical Seals. They're especially designed for Type CG Worthite Pumps up to 1200 gpm capacity.

These seals have given outstanding performance in corrosive liquid service. The following distinctive features tell you why:

No stuffing box . . . no packing to replace. Outside assembly . . . easy to apply, simple to repair. No parts churning in acid. All parts made of corrosion resisting material. Pressure is adjustable without dismantling. Single coil Worthite spring. Tongue and groove drive.

Write for BULLETIN W-350-B-10.

For complete details about this Worthington contribution to better pumping of corrosive liquids and further proof that *there's more worth in Worthington* write for Bulletin W-350-B-10. *Worthington Pump and Machinery Corporation, Centrifugal Pump Division, Harrison, N. J.*



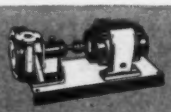
Exploded view of Worthington Type EA Mechanical Seal shows simplicity of this tested solution to tough stuffing box problems.

CGH-1A Worthite pump equipped with Worthington Mechanical Seal in a Southern chemical plant.

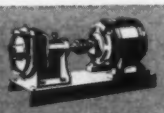
WORTHINGTON

CB-6

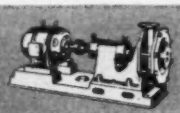
THE WORLD'S BROADEST LINE ASSURES YOU THE RIGHT PUMP FOR EVERY JOB



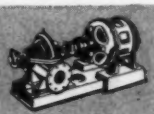
Types CB and CBL. Sizes ½" to 10". Capacities to 5000 GPM; heads to 200 ft. Liquid ends of WORTHITE alloy.



Type CP. Sizes 1" to 4". Capacities to 1000 GPM; heads to 130 ft. Standard, all iron and all bronze.



Type CQ. Sizes 1½" to 3". Capacities to 600 GPM; heads to 130 ft. at 1750 RPM. Closed impeller. WORTHITE shaft and fittings.



Type L. Sizes 3" to 8". Capacities to 2250 GPM; heads to 300 ft. Single stage volute. For general service.

Two-Day TAPPI Conference Devoted to Coating Problems

▶▶▶ "AN OUTSTANDING success," was the way A. E. Bachmann, national president of the Technical Association of the Pulp and Paper Industry, styled the two-day coating conference held at the Pantlind Hotel, Grand Rapids, Michigan, April 26 and 27.

Sponsored by the Kalamazoo Valley Section of TAPPI, this was the first national meeting of the Association devoted exclusively to coating problems.

Paul W. Bartholomew, Hawthorne Paper Company, Section chairman, was general chairman of the conference. W. A. Kirkpatrick was chairman of the technical paper committee; R. R. Buss, Hercules Powder Company, transportation, and Jack Dickson, R. T. Vanderbilt Company, handled all the printing details.

Other details in connection with the work, such as registration and reservations, were handled by Dr. Stephen I. Kukolich, Lee Paper Company, Vicksburg, Michigan, Section vice chairman; Dr. James J. Harrison, Michigan Carton Company, Battle Creek, secretary, and Dr. Victor Burnstein, Michigan Paper Company, Plainwell, treasurer.

More than 300 technical men and department and division heads were registered. During the sessions, eight technical papers were given as follows:

"A Tentative Hypothesis Explaining the Mechanism of Bonding Clay Coatings to Paper," by Glenn Davidson, consultant and distributor of Soyize Adhesives.

"Methods of Testing Coating Paper for Resistance to Picking on Printing Presses," by Glenn Davidson.

"Titanium Pigments in Coating," William R. Willets, Titanium Pigment Corporation.

"Georgia Clays—Their Refinement and Use in the Paper Industry," by Malcolm S. Burgess, Thiele Kaolin Company, and president Burgess Pigment Company; and George F. Blasius, vice president and technical director, Burgess Pigment Company.

"Some Considerations with Respect to Soybean Protein," by N. R. Gotthoffer, Research Administrator, The Drackett Company.

"The Effect of Dow Latex 512-K on Starch-Clay Coated Papers," by E. K. Stilbert, Coatings Technical Service, Dow Chemical Company, and Messrs. R. D. Visger and R. H. Lalk, Coatings Technical Service, Dow Company.

"A New Method of Coating Paper Involving Ion Exchange," by D. Robert Erickson, Chemical Process Consultant.

"The 'Microjet' and 'Syncroset' Coaters," by B. R. Newcomb, president John Waldron Corporation.

A minimum of time was given to the social side of the conference. Luncheon the first day was the only break and that allowed only two hours between morning and afternoon technical sessions. There was no program and the banquet that evening was programless, since the men had been invited to attend as guests a performance of "John Loves Mary" by the Grand Rapids Civic Players.

The customary banquet of such affairs was held Wednesday noon, with Dwight Stocker, president of the Michigan Paper Company, toastmaster. The speaker was R. B. Cancell, vice president of the St. Regis Paper Company, Deferiet, New York and his topic "The Place of the Technical Man in the Printing Paper Industry." Mr. Cancell is in charge of manufacturing for the printing, publishing, and converting paper divisions.

During the conference, wives of those in attendance were entertained with a hat show and a tea, featured by the drawing for a gift hat, on the first day and a tour of the Grand Rapids Furniture Mart the second day.

The day following the conference a large number of the technical men from outside the Kalamazoo Valley toured mills of the section, with transportation provided by Mr. Buss from Grand Rapids to the mills designated and return.

Among the special guests were Albert E. Bachmann, national TAPPI president; Dr. Alfred Nadelman, head of the paper technology department of Western Michigan College, Kalamazoo; R. T. Bingham from national TAPPI headquarters, and Dr. Werner Kaufman, Chicago, chairman of the national TAPPI Coating Committee.

Toastmaster Stocker, introducing Mr. Cancell, commented on the vast change in conditions in the coating departments in the last two decades. In the "old days," he said, "coating processes and formulae were so secret that they were often not even put on paper. In those days often the superintendent

At the speakers table for the luncheon of the TAPPI Coating Conference were: (L to R) A. E. Bachmann (Missisquoi Corp.), national TAPPI president; B. R. Cancell (St. Regis Paper Co.), who was the principal speaker; Dwight Stocker (Michigan Paper Co.), toastmaster; Paul W. Bartholomew (Hawthorne Paper Co., and Kalamazoo Valley TAPPI chairman), who was general chairman of the Conference; and R. R. Buss (Hercules Powder Co.), in charge of all transportation

and the men in the coating and color departments were the only ones who knew what went into the slurry.

"It is really news when we come to a session such as this one, to sit down together and discuss our coating problems openly and for the benefit of all of us."

The speaker said he had been thinking along that same line, in view of the situation that has arisen since the war demand slackened.

"The period of prosperity in the paper industry, was so marked in the war years that some of us feel that the present decline in demand has hit us like the crack of doom."

"That, however, is no reason for reducing research programs," he contended. "It has caused, and rightly, a revaluation of the programs, but should intensify them, not cause a curtailment."

Mr. Cancell also went on record for continuation of fundamental research by the industry, declaring that in the long run the results would justify present spending that seems to be without immediate tangible return.

Coming of high speed presses, machine coating and new inks, he said, have brought with them demands for specially coated papers. He feels that great advances are soon to be made in the quality of machine coated papers and that this improvement will come as soon as machines are built which can put the known processes into practice.

Mr. Cancell cited the increased interest in plastics and other synthetics in the printing trade as one contribution by the technical man. Also, he said, they are placed along side the work being done in use of a wider range of woods for pulp, and that is of definite benefit in conserving the forest resources of the nation.

Lastly, he said, "friendship selling is out and the day of the technical sales service engineer is here. If the salesman doesn't know the answer to the customer's needs and can't tell him wherein the superior qualities of his paper suit his needs, said saleman will soon find the customer turning to the salesman of the other company, who can."

▼

▶▶▶ NEW OFFICERS of the Pacific Coast Association of Pulp and Paper Manufacturers are: Lawson Turcotte, of Bellingham, Washington, who was re-elected president; Alexander R. Heron, San Francisco, executive vice president; Anson Moody, Everett, Washington, vice president; Robert S. Wertheimer, Longview, Washington, secretary-treasurer; and S. W. Grimes, Portland, Oregon, assistant secretary. The election took place at Portland, Oregon.

Left to Right—Hans W. Giertz, Stockholm; Harold Wall, Longview; and Dr. Erik Hagglund, Stockholm, who was the speaker at Pacific TAPPI meeting

Dr. Hagglund Addresses Meeting of Pacific Section of TAPPI

▶▶▶ MORE THAN 200 members and guests attended the meeting of the Pacific Section of TAPPI which was held at Longview, Washington on April 9.

New officers elected at the meeting were:

Chairman—Walter Holzer, technical director, Crown Zellerbach Corporation, Camas, Washington.

Vice Chairman—I. R. Thieme, technical director, Soundview Pulp Company, Everett, Washington.

Secretary-treasurer — R. M. True, General Dyestuff Corporation, Portland, Oregon.

Executive Committee members named inclued Eric Ericsson, Puget Sound Pulp and Timber Company, Bellingham, Washington, and Ben Natwick, Appleton Wire Works, Camas, Washington.

Speaker at the meeting was the internationally-known Dr. Erik Hägglund, chief of the wood chemistry department of the Swedish Forest Products Research Laboratory at Stockholm. Dr. Hägglund gave a highly technical treatise on the chemistry of the kraft process in pulp manufacture.

The Shibley award for the best research paper presented during the year was made to Vance L. Reynolds, of the Puget Sound Pulp & Timber Company, for his paper entitled "Separation of Dirt from Unbleached Pulp by Centri-

Shibley contestants (L to R): Robert S. Towne, J. A. Dykstra, Vance L. Reynolds, Everett J. Reichman

fugal Type Classifiers." Other contestants included Robert S. Towne, Fibreboard Products, Inc., Port Angeles, Washington, subject, "Attaining Optimum Boiler Operation"; Everett J. Reichman, Simpson Logging Company, Shelton, Washington, "Evaluating Pulp for Soft Board Manufacture"; and J. A. Dykstra, Oregon City, Oregon, "Furnish Measurement Problems of a Fast Newsprint Machine." *(Brief abstracts of the Shibley Award papers mentioned are given here.)*

Vance L. Reynolds

Abstract

The possibilities of removing dirt from unbleached sulphite pulp by use of the Dirtec, manufactured by the Bird Machine Co., and of the Vortrap, manufactured by Nichols-Freeman, were investigated. Results of tests to determine dirt removal efficiency are presented together with the effects of operating variables on classifier efficiency and capacity.

The Nichols-Freeman Vortrap and the Bird Dirtec are well known equipment that have been used for years to remove dirt from stock in paper mills, where installations have been reported as being very efficient. The classifiers, however, have not found as wide spread use in the pulp industry, although the manufacturers have suggested that they can be used with advantage for removing dirt during the process of manufacturing wood pulp. To the best of our knowledge Stevenson has made the only reported investigation of this possibility. He found that the VORTRAP compares favorable with rifflers for removing dirt from bleached pulp, but obtained a very low efficiency when unbleached stock was treated under the same conditions. It was therefore the purpose of this investigation to study more thoroughly the possibilities of utilizing this type of equipment to remove dirt from unbleached pulp. The work falls logically into two parts, first evaluating a method for measuring the efficiency of the equipment and second, testing the equipment to measure its efficiency under different conditions of operation.

Summary

It is realized that the results of this work, obtained with unbleached sulphite pulp at the plant of the Puget Sound Pulp & Timber Company, may differ from results obtained at other mills where the conditions of operation are not the same. Also, it should be pointed out that this was not intended to be an exhaustive study of centrifugal dirt separation. With these reservations in mind, however, there is every reason to believe that the results set forth are indicative of the results to be expected in other similar installations.

In summary the findings were:

1. The Dirtec and the Vortrap have been found to remove dirt and shives from unbleached sulphite pulp in the order of 30 per cent of the specks and 10 per cent of the shives.

2. Experimentation indicated that a high positive bleed is necessary, and that the sumps as settling chambers are ineffectual with unbleached stock.

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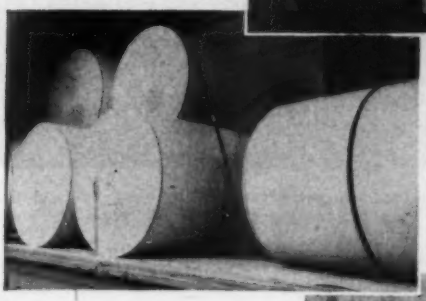
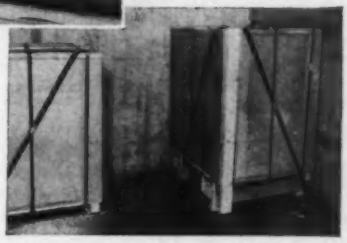


Rolls of chipboard braced in units by Acme Unit-Load Band.



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Left to Right—R. M. True, secretary-treasurer; I. R. Thieme, vice chairman of Pacific Section of TAPPI; Otto Sangder; and Harold Wall, retiring chairman of the Section

3. An installation of these classifiers can be so arranged that losses of acceptable fiber are held to a minimum.

4. There is no apparent change in Dirtec efficiency when capacity is increased by enlarging the inlet nozzle.

5. Although it was not the purpose of this paper to critically compare the Vortrap with the Dirtec, results of tests made on both of the classifiers indicate that they are about equal in dirt removing ability.

Robert S. Towne

Many factors with varying degrees of importance must be considered before a boiler installation can be operated with a maximum of efficiency. When oil is used as a fuel, its temperature and pressure determine to some extent the efficiency with which it can be burned in a given installation. When this oil is atomized with steam, the pressure of the steam also has a bearing on the end result. Only enough steam should be used to properly atomize the oil so that complete combustion will occur. Although steam in greater quantities, up to a certain point, is not detrimental to the burning of the oil it is not neccessary and is only being wasted.

Most important of the controllable variables is the air-fuel ratio in the combustion chamber. Maximum economy can be obtained at each load setting of the boiler only when the draft is set for complete combustion with a minimum of excess air. The best method for determining this point is to take a flue gas analysis with an orsat as the draft is increased and the fuel flow remains constant. The draft at which the CO_2 reading is a maximum is the proper setting for that rate of fuel feed.

Calibrating an air-flow pen to the correct draft for various boiler loads enables the operator to maintain the proper air-fuel ratio in the furnace by adjustment of the dampers. For highly variable steam loads automatic boiler controls insure a proper air-fuel ratio no matter at what per cent of rating the boiler is operating.

Everett J. Reichman

"Shortly after our company had decided that insulating board was a potential product for the utilization of our sawmill slabs and edgings, work in commercial laboratories was started in order to evaluate the process. Results from these laboratories indicated that the process was feasible, so full size pulping equipment was obtained and a laboratory was equipped to evaluate more of the variables of the process.

"A literature survey indicated that there was no standard method for the evaluation of pulps for softboard manufacture, and one of the first problems confronting the laboratory was a standard method of evaluation.

"Realizing that the drainage rate of pulp would be a critical factor on a board machine, the freeness test was chosen as a control test. A fiber classifier was used to augment the freeness test and give a more precise evaluation of the pulp and as a final criterion of board making qualities, a method of making test boards was developed. The staff felt that if a test sample could be made which could closely resemble the finished produce, the method by which it was made closely resembled the manufacturing process, the test results should apply to full scale production. Mill results have shown this to be true to a point and the test method which was developed and tested in the lab has been invaluable not only in the development state of the mill, but in answering many problems which could not be solved in actual production.

"Although this method has only been used on mechanical pulps made from wood logged commercially in the Pacific Northwest, it is felt that it would be suitable for evaluation of other pulps being used for softboard manufacture.

"Fundamentally, the method is to make six test boards, each one-half inch thick when dried. The pulp samples are weighed out so that the six boards range in weight from 0.55 to 0.8 lb. per square foot. The test boards are sawed into strips for flexure and tensile strength measurements, which are plotted on graphs as functions of the board weight. This gives a plot which can be called the strength characteristic curve of the pulp.

"The personal element and limitations of laboratory equipment make it necessary to assume that softboard is a homogeneous material which reacts according to the flexure formula. Sample boards are rarely exactly one-half inch thick when dried, hence the flexure formula is used to calculate what the breaking load would be for the same board if it were one-half inch thick. The results have shown this assumption to be valid within the limits of experimental error."

J. A. Dykstra

The accuracy of the total furnish method of calculating the ratio of sulphite to groundwood using a correction factor established by experiment, is within the error of the various measurements.

It has been suggested that a better method than freeness be used for determining the white water fines in the sulphite. Several different methods were tried, but none proved as quick or any more accurate than the freeness. A fractionation is slow and subject to fluctuating errors. One method tried, was to run a permanganate number on the mixture and determine the percentage sulphite from a curve plotted on known mixtures of fines and sulphite. The permanganate number of one gram of solids from the effluent from the filter is 409 cc. and on one gram of sulphite it is about 13. With this extreme range in which to work, it was hoped to find a curve that would give the per cent sulphite more accurately than the freeness method, but even using the same sulphite and the same source of fines, the curve did not correspond to the known percentages.

There are possibilities, however, in a chemical determination because of the difference in nature between the groundwood and the cooked sulphite, but because of limited time, the problem is left for future investigation.

Worthen Taylor Speaks Before Connecticut Valley Superintendents on Stream Pollution

▶▶▶ AT A MEETING of the Connecticut Valley Division of The American Pulp and Paper Mill Superintendents Association, Inc., held March 25 in the Hotel Sheraton, Springfield, Massachusetts, Worthen Taylor, Massachusetts State Department of Health, presented his views on stream pollution as applied to Massachusetts.

Mr. Taylor pointed out that Massachusetts does not expect every stream to be a trout fishing stream; neither does it want these streams to be open sewers. A classifying system for streams, totaling five divisions, has been set up by the State, he said. Before any stream has been put into any one of the five classifications, Mr. Taylor commented, industry and the general public will be invited to public hearings for the purpose of expressing their views on such classification. Mr. Taylor further pointed out that industry has been much more co-operative

than municipalities in the handling of stream pollution problems—that there has not been a single instance of an industrial establishment being brought into court, whereas a couple of municipalities have had to be treated in that manner.

William Wiese, Connecticut State Water Commissioner, also on the program, declared that most of the emphasis in the past was placed on sewage pollution of streams, but that in recent years it has been an industrial pollution. He also related that the health hazard of industrial pollution has been much overemphasized, that industrial pollution of streams does not cause much of a health hazard, but rather may develop an obnoxious condition due to odor, and perhaps render such water of little value for subsequent use.

The control of stream pollution, commented Mr. Wiese, is largely the conservation of a valuable natural resource. State control of this resource, he added, is necessary because of the continuously increasing demands for water being made by certain types of industry for both processing and cooling purposes.

Mr. Wiese, further related that there is no water supply shortage in Connecticut at the present time. However, if the industrial demand for water continues to increase as it has recently, he added, it will become necessary to use the water over and over again.

About 50 per cent of the pollution load in Connecticut today, said Mr. Wiese, is contributed by industry. Thus, the success of any stream pollution program depends to a great extent on the support given to it by superintendents of industrial plants concerned with the problem. In concluding his remarks, Mr. Wiese appealed for proper co-operation on the part of plant operators, stating that the laws in Connecticut at present are pretty lenient, but stricter laws will be passed if this co-operation is not given.

Andrew (Andy) H. Gilmour, C. H. Norton Company, chairman of the Connecticut Valley Division, presided at the meeting. As spokesman for the Division, he also presented a certificate to Raymond C. Winkler, Chemical Paper Manufacturing Company, for his services as chairman of the Division during 1947-1948.

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▶▶▶ THE CHICAGO OFFICE of The American Pulp and Paper Mill Superintendents Association, Inc., has been moved from 38 S. Dearborn Street to 111 West Washington Street, zone 2. This office is in charge of Harry E. Weston, associate secretary-treasurer of the Association.

2 GOULDS CENTRIFUGAL STOCK PUMPS That Cut Costs

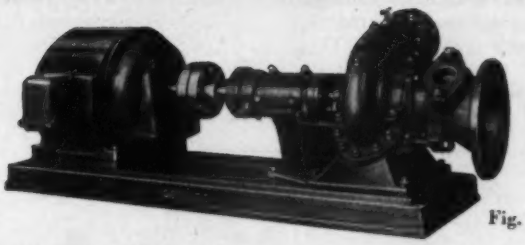

Fig. 3105

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A Few Advantages: Impeller—open, single end suction non-clogging type. Vanes warped to give screw conveyor effect, insuring even flow of stock. Prevents water separation. No nut or obstruction at impeller eye to catch fibre.

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Special Program and Features Are Planned for Superintendents Convention

▶▶▶ THE ANNUAL Convention of The American Pulp and Paper Mill Superintendents Association will be held June 15-17 at Haddon Hall, Atlantic City, New Jersey. A tentative program for the three-day meeting has been announced. It includes scheduled meetings of the various groups together with general conference sessions. There are, of course, the usual social events.

An unusual program has been planned for a general meeting on Materials Handling. Matthew W. Potts, well-known materials handling consultant, will be moderator of the session; Charles H. Reese, Nekoosa-Edwards Paper Company, will be the chairman.

Mr. Potts now conducts his own business as a materials handling consultant. He also is Materials Handling Editor of *Distribution Age* magazine. He has functioned as secretary of the Materials Handling Division of the American Society of Mechanical Engineers. Formerly he was associate editor of *Industrial Management*. He is the author of numerous articles in the technical press, also of several books.

The Power Group meeting includes the presentation of two papers and the showing of a colored sound movie on "Steam for Power." Roland A. Packard, The Bagley & Sewall Company, Watertown, New York, will act as chairman.

One paper entitled "Lubrication and Its Effect on Paper Mill Operating and Maintenance Costs" will be a joint contribution of J. P. Critchlow and D. R. Kroell, both of the Gulf Oil Corporation. The other, "The Effect of Condensate and Air on Output, Quality, and Steam Consumption of Paper Machine Dryers" is to be a contribution of Albert Milnes, Sarco Company, Inc.

The movie, "Steam for Power," is presented by The Babcock & Wilcox Company. It makes extensive use of both animation and photography, and shows in simple, concise form the evolution of boilers for both industrial and central station power plants. Running time is 41 minutes.

This year's convention represents the Thirtieth Anniversary of the Association.

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▶▶▶ PLANS FOR the fall meeting of the Southeastern Division of The American Pulp and Paper Mill Superintendents Association, Inc., have been announced by Secretary-Treasurer C. B. Curry (National Container Corporation of Virginia, Big Island, Virginia). The meeting will be held October 14 and 15 at the Hotel Roanoke, Roanoke, Virginia.

▼

GIMMICK CONTEST OPENED BY SUPERINTENDENTS ASS'N

Announcement of a gimmick contest that is open to any employee of a pulp and paper mill, whether in supervisory, technical or operating capacity, was made recently by Ollie W. Messner (Tarentum Products Corp.), national president of The American Pulp and Paper Mill Superintendents Association, Inc. The only limitation on the contest is that each entry must be of a device that has been contrived to simplify or improve an operating or mechanical (such as involved in construction and maintenance work) procedure.

All entries must be submitted to Harry E. Weston, associate secretary-treasurer, The American Pulp and Paper Mill Superintendents Association, Inc., 111 West Washington Street, Chicago 2, Illinois, not later than June 1, 1949. These entries will be judged by a panel of three experts to be se-

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lected by Mr. Messner, at the next annual convention of the Association (June 15-17, 1949, Haddon Hall, Atlantic City, New Jersey).

The individual entry may include either an actual exhibit of the gimmick with legend material, giving name of device, if any, and a brief description of its application and method of use; or it may consist of only the descriptive material with such sketches or photographs as are necessary to illustrate its design, application, and use.

Three prizes are to be awarded—a first prize of $50, a second prize of $35 and a third prize of $15.

The purpose behind the contest is to bring numerous gimmick ideas out into the open so that they can be of the greatest good to the greatest number of persons.

▼

THE FALL MEETING of the New York-Canadian Division of The American Pulp and Paper Mill Superintendents Association, Inc., will be held September 8, 9, and 10, in the Champlain Hotel, Bluff Point, Plattsburgh, New York. Chairman of the Division, J. O. Julson of the Diamond Match Company, Plattsburgh, made the announcement.

▼

TUBE WINDING DISCUSSED BY SPEAKERS AT MEETING OF CHICAGO TAPPI SECTION

The April meeting of the Chicago Technical Association of the Pulp and Paper Industry covered the subject "Tube Winding."

Two speakers were featured: J. J. Callahan, manager, Cleveland Container Company, Plymouth, Wisconsin; and Burger Graves, assistant sales manager, Sefton Fibre Can Company, St. Louis, Missouri.

Mr. Callahan spoke on the growth of the tube winding industry and the part that TAPPI played in making this growth possible. Mr. Graves covered the manufacturing methods, protective properties, and merchandising possibilities of both spirally wound and convolute wound fibreboard containers, illustrating his talk with a series of photographic slides as well as samples of different types of cans and closures.

▼

PLANS UNDER WAY FOR FALL TAPPI MEETING IN PORTLAND

Subjects to be presented during the business sessions of the 1949 fall TAPPI convention scheduled for September 12-15 at the Multnomah hotel in Portland, Oregon, were organized by members of the program committee meeting April 22 in Seattle, Wash.

The general session on Wednesday

Here is the valve that *Eliminates* these common troubles

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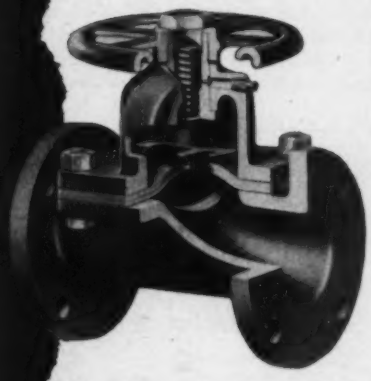

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morning, September 14th, will be opened by Dr. W. F. Holzer, chief of the fibrous raw materials division, central research and technical department, Crown Zellerbach Corp., Camas, Wash This phase will include talks by national officers, presentation of the Shibley Award, and one paper on the Pacific coast pulp and paper industry prepared by a prominent mill executive.

After considerable discussion on the technical sessions, five subjects were assigned for the two periods, Wednesday afternoon and Thursday morning, with each member of the committee agreeing to be responsible for one session. Assignments are: sulphite pulping, E. O. Ericsson; kraft pulping, H. C. Wall; fundamental research, Dr. J. L. McCarthy; engineering, R. I. Thieme; papermaking, Otto Sangder.

Thursday afternoon a final general session will be held during which the three following broad papers on the industry will be presented: (1) Economic and social status of the pulp and paper industry in our modern civilization; (2) The position of cellulose as a chemical raw material; (3) The role of education in assisting the industry to maintain its position.

It was suggested that there be an integration between the woods and mill trips and the technical program, making these features more than simply guided tours. Suggestions for the woods trip were a display in charts, photographs, and samples of the problems, aims and scope of forest management together with a brief orienting talk during lunch in the woods. On the mill visits, it was pointed out that the mill manager or some high official could give the highlights of the new developments. Guides could be furnished for each section of the mill, giving visitors an opportunity to concentrate on the portion of their interest rather than having a superficial visit to the entire plant.

The question of a round-table discussion at dinner meetings on one evening, probably Tuesday, September 13, was decided against on the ground that those in attendance would probably prefer to have some unscheduled time for their own plans.

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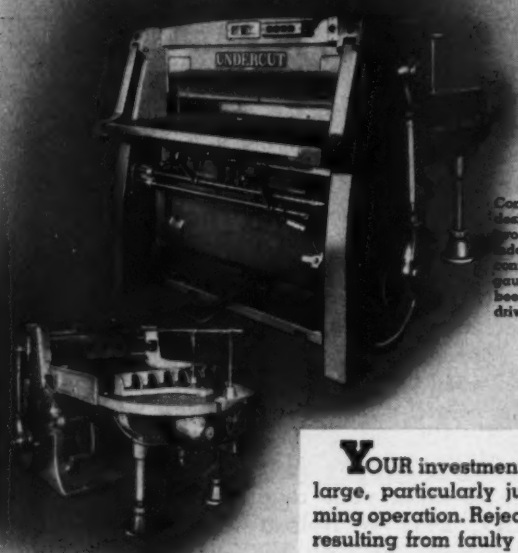

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COMING EVENTS

June 1-3 — Canadian Pulp and Paper Ass'n, Technical Section, General Brock Hotel, Niagara Falls, Ontario.

June 8-9—General Management Conference, American Management Ass'n, New York City.

June 15-17—Annual convention of the Superintendents Association will be held at Chalfonte-Hadden Hall, Atlantic City, New Jersey.

June 17-18—TAPPI (Maine-New Hampshire Section), Wentworth-by-the-Sea, Portsmouth, New Hampshire.

June 17-18—Paper and Twine Ass'n, French Lick Springs, Indiana.

Sept. 8-10—Supt. Ass'n, N. Y.-Canadian Div., Champlain Hotel, Bluff Point, Plattsburgh, N. Y.

Sept. 12-15—TAPPI (National) General Fall Meeting, Multnomah Hotel, Portland, Ore.

Sept. 16 — Conference of Northeastern Wood Utilization Council on Wallboards will be held in Cambridge, Mass., with the co-operation of Harvard University. Attendance limited to 75. Obtain invitations by writing E. L. Heermance, Sec., Northeastern Wood Utilization Council, New Haven 6, Conn.

Sept. 26-29—National Paper Trade Ass'n, Fall Meeting, Stevens Hotel, Chicago.

Oct. 4-7—Society of Industrial Packaging and Materials Handling Engineers, Fourth Annual Exposition, Convention Hall, Detroit, Mich.

Oct. 14-15 — Supt. Ass'n, Southeastern Div., Hotel Roanoke, Roanoke, Virginia.

Oct. 25-28 — National Safety Council, 1949 National Safety Congress, Chicago.

Oct. 31-Nov. 3—TAPPI, Engineers Conference, Statler Hotel, Boston, Mass.

Nov. 1-5—Pacific Chemical Exposition, California Section, American Chemical Society, Civic Auditorium, San Francisco, California.

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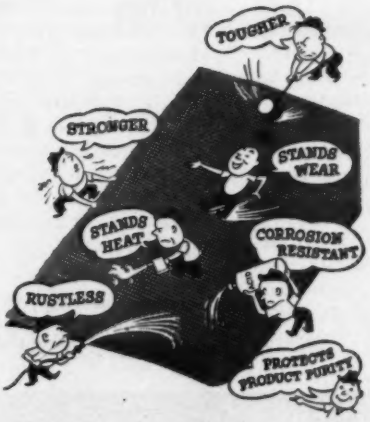

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The next time you replace or install wire cloth, investigate the "task metals." Thanks to easy working qualities, weavers produce wire cloth of Monel, Nickel and Inconel at prices comparable to what you now pay for cloth of less durable metal. *Fine weaves of Monel often cost less!*

Consult any quality weaver. *He'll be glad to recommend types and quote prices. For booklet,* "ESTABLISHED WEAVERS," *write to our Frank Bailey.*

Monel® Nickel Inconel®

"Task Metals" for Industry

EMBLEM OF SERVICE INCO TRADE MARK

THE INTERNATIONAL NICKEL COMPANY, INC.
67 Wall Street, New York 5, N. Y.

*Reg. U. S. Pat. Off.

Allied

Black-Clawson Forms Subsidiary To Operate in United Kingdom

▶▶▶ OFFICIALS OF The Black-Clawson Company, Hamilton, Ohio, have announced the formation of a new subsidiary in the United Kingdom, to be known as B-C International, Limited, with offices at 16 Catherine Place, Victoria, London, S. W. 1. It will be operated as a division of The Black-Clawson Company, with full control and responsibility vested in the American parent organization. Foreign offices of the company will be at Middletown, Ohio.

B-C International is fully organized, with an engineering and sales staff headed by both English and American engineers to insure correct application, quality of material and workmanship of Black-Clawson British-built equipment.

Specialized paper machine parts, and other component paper machine parts not heretofore manufactured in England, as well as a full line of specialized paper converting equipment will be available through the new company. All inquiries should be directed to the Catherine Place address.

Engineers and technicians from The Black-Clawson, Shartle, and Dilts organizations are being rotated on a liaison basis between the United States and the United Kingdom to augment and give full technical assistance to the domestic paper mills in England, and to the many export customers to be serviced by B-C International, Limited.

Officials and executives of the London Company are as follows: Homer D. Martindale, chairman; J. D. Haskell, managing director; Air Commodore T. C. Miller, deputy managing director; C. R. Crawford, director; P. H. Fogg, director and chief engineer.

Frank T. Peterson of the Black-Clawson home office and J. Couture, chief engineer of the Dilts Division, are in the United Kingdom at present. Mr. Peterson is "roving engineer" and will travel in Europe in co-operation with the B-C International, Limited, organization in a liaison and consultive capacity. He will be assisted by other engineers soon to be appointed.

▼

USE OF DETREX TRADE NAME HAS BEEN EXTENDED

The use of its registered trade name "Detrex" is being extended by the Detrex Corporation, Detroit, Michigan, to include its line of alkali cleaning compounds, strippers, emulsion cleaners, and wet spray booth materials. The trade name "Detrex" is followed by a number or letter to indicate the different materials to which it is applied. These identifying numbers or letters are not being changed.

The registered trade name "Triad" is now being reserved exclusively for use in identifying Detrex Corporation's chlorinated hydrocarbon solvents for vapor degreasing and oil extraction.

▼

GENERAL FILTER CO. HAS BECOME AN AFFILIATE OF LAYNE AND BOWLER, INC.

The addition of General Filter Company of Ames, Iowa, to its organization has been announced by Layne and Bowler, Inc., vertical turbine pump manufacturers in Memphis, Tennessee.

Organized in 1935 by a former Layne engineer, J. P. Lawlor, the General Filter Company is a company of engineers and chemists devoted to the broad field of water conditioning. Through use of a variety of methods ranging from aeration to demineralization, any type of water can be treated to meet the standards required by municipalities and industries.

In the new setup of the organization, Mr. Lawlor is to remain as president, and the new board of directors consists of Lee Rogers, Layne-Minnesota Company; J. P. Lawlor, General Filter Company; S. L. Olson, Layne-Texas Company; A. W. Ross, Layne-New York Company; M. H. Anderson, General Filter Company; T. M. Ragsdale, Layne-Central Company; and A. G. Schreiber, General Filter Company.

▼

TWENTY-FIVE YR. CLUB OF J. O. ROSS ENGINEERING CORP. HONORS R. W. GROTT

The "Twenty-Five Year Club" of the J. O. Ross Engineering Corporation held a dinner at the Roosevelt Hotel, New York, April 20th at which R. W. Grott was the guest of honor. During the evening, J. O. Ross, chairman of the board, presented Mr. Grott with a beautiful wrist watch to commemorate the event.

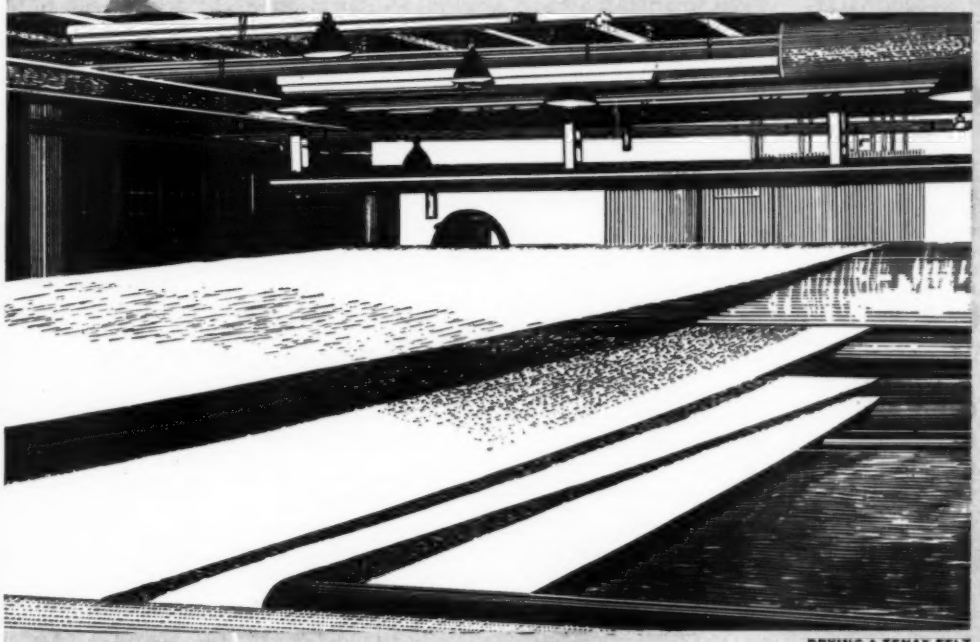
In addition to Mr. and Mrs. Grott and Mr. and Mrs. Ross, other members of the Ross Twenty-Five Year Club and their wives who were present included: President S. W. Fletcher and Mrs. Fletcher, Vice President A. E. Montgomery of Chicago and Mrs. Montgomery, Vice President F. W. Partsch of Boston and Mrs. Partsch, and Mr. and Mrs. R. E. Schultz.

Mr. Grott began as a draftsman with the company in 1924, and is at present an executive in the Engineering and Purchasing Department of the Ross organization.

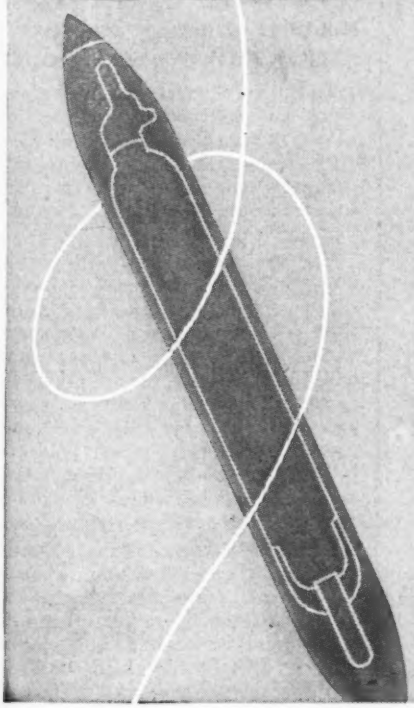
Ross Engineering "Twenty-five Year Club" fetes R. W. Grott (shown at extreme right)

TENAX FELTS

—lower your operating costs
—by increasing the efficiency of your
paper-making machines



DRYING A TENAX FELT



Experts, with many years experience, carefully supervise each phase of production in the Lockport Mill. All their efforts serve to give you felts most suited to your paper-making needs.

The Lockport representative in your territory is fully qualified to advise on all technical questions relating to felts. He is at your service as is our plant and all its people. We invite your inquiries.

LOCKPORT FELT COMPANY · NEWFANE, NEW YORK

F. W. ROBERTS MFG. CO. ACQUIRES INT'L BURR CO.— HAS MOVED IT TO LOCKPORT

Established in Watertown, New York, in 1916, the International Burr Company has been sold by W. G. Crossman to the F. W. Roberts Manufacturing Company, Inc., Lockport, New York, and the physical equipment has been removed from this city to Lockport.

Mr. Crossman, who has owned and operated the business for the past two and one-half years, did not announce the sale price. The company made sharpeners for pulp stones.

▼

KOPPERS CHEM. DIVISION OPENS NEW ENG. SALES OFF.

A New England District sales office located at 250 Stuart Street, in Boston, Massachusetts, has been opened by the Chemical Division of Koppers Company, Inc., Pittsburgh, Pennsylvania. The new district will consist of all of New England in addition to a portion of New York State bounded by Kingston, Binghamton, and Syracuse. Creation of the new sales office came as the Eastern District sales territory, with headquarters in New York City, was divided into the New York district and the New England District.

J. W. LaBelle of Arlington, Massachusetts, has been named manager of the new sales district. He has been in charge of Boston sales for the Chemical Division's Eastern District.

The Chemical Division joins Koppers Tar Products and Wood Preserving Divisions, both of which maintain New England District sales offices at the same Boston address.

▼

▶▶▶ THE GENERAL offices of the Baker Industrial Truck Division of The Baker-Raulang Company have been moved to 1250 West 80th Street, Cleveland 2, Ohio. The manufacturing operations, now located at the West 25th Street plant, will be moved to the new location in the very near future.

▼

▶▶▶ THE FOUNDRY of the Carthage (New York) plant formerly operated by Ryther & Pringle Company has now gone into production, according to an announcement from the new owners, William G. Lewis, Jr. and Walter Clinch. Last January, the plant was purchased by Lewis and Clinch from Charles I. Ruderman, operating as the Ruderman Machinery Exchange, Gouverneur, New York. He had owned the plant for ten years.

SHARTLE LECTURE COURSE TAKES UP MODERN METHODS OF PULP AND PAPER MFR.

"Instrumentation for Papermaking and Converting" was the subject of the eighth talk in the current series of lectures on "Modern Methods of Manufacture of Pulp and Paper" being given in the Black-Clawson-Shartle-Dilts lecture course. The speaker was Harold A. Sholl, paper industry engineer of the Brown Instrument Division of Minneapolis-Honeywell Regulator Company, who specializes in the application of instruments to the paper industry. He stressed the value of recording and remote control instruments in the modernization of today's paper mills and converting plants.

The course is being given in the Shartle classroom of Shartle Brothers Machine Company, Middletown, Ohio.

A lecture on the "Manufacture of Tissue Paper" was also given May 3 by L. P. Thompson, production manager, Personal Products Corporation of Milltown, New Jersey.

▼

▶▶▶ TO SERVICE the Texas, Oklahoma and Louisiana territory, The Cooper Alloy Foundry Co., Hillside, New Jersey, has appointed Ernest E. Graham of E. E. Graham & Company, Houston, Texas, as sales representative. Mr. Graham will maintain his headquarters in Houston, and will service the territory with a complete line of Cooper Alloy stainless steel valves, fittings and engineered castings.

▼

G-E WILL BUILD APPARATUS SERVICE SHOP & WAREHOUSE

To provide better repair, maintenance, and warehousing facilities for its customers in Virginia, General Electric, Schenectady, New York, will establish a new apparatus service shop and warehouse in Richmond late this summer.

The new service shop will contain the latest in machine tools to service and repair motors, generators, transformers, control devices, switchgear, and other apparatus. The new shop will, in effect, bring the factory closer to the customer, since it will be staffed and supervised by men thoroughly trained in factory practices. This will be the twenty-ninth in the chain of G-E apparatus service shops across the country.

The new warehousing facilities will cut down the delivery time of many G-E apparatus products to customers, because many standard items that ordinarily must be ordered from distant factories will be carried in the Richmond warehouse stock.

Motor Driven APCO Two Stage, Water Jacketed, Turbine-Type Pump with Flange Connections.

SINGLE AND TWO STAGE • 1750 R.P.M. • WIDE RANGE OF SIZES • FOR SCREW OR FLANGE CONNECTIONS

Write for BULLETIN 111-WJ

These notable pumps are made available "by request" of many of our engineer friends. Water jacketed APCO pumps were developed specifically for the efficient handling of high temperature and highly volatile liquids. They are designed to compensate for expansion and contraction due to heat. Because Apco's multi-vaned impeller handles vapor or air along with the liquid there can be no vapor lock within the pump. The cool liquid in the water jacket reduces the temperature of any liquid leakage through the extra deep stuffing boxes — thus flashing or vaporizing of the leakage is prevented. May be made of any machinable metal for handling corrosives. Requires but small amount of such special metal — with resultant economy. We invite your consideration of the many features of these fine pumps.

AURORA CENTRIFUGAL PUMPS

A complete line, notable for streamline coordination between impellers and shells, including Single and Two Stage Horizontally Split Case, Side Suction, Vertical, Non Clog, Sump, Mixed Flow, Special Design, etc.

DISTRIBUTORS IN PRINCIPAL CITIES

AURORA Always PUMPS

AURORA PUMP COMPANY

110 Loucks Street, AURORA, ILLINOIS

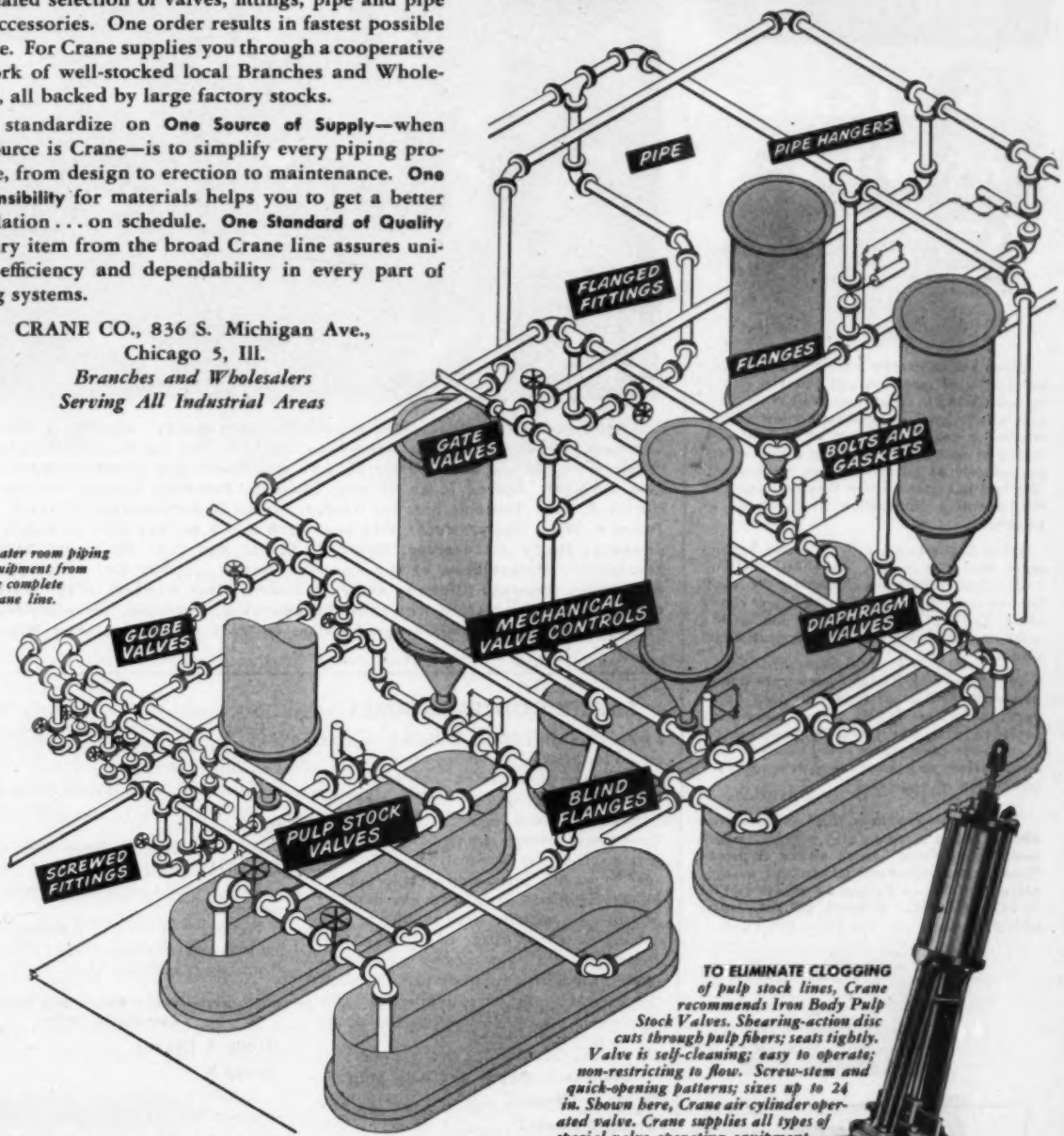
You name it...CRANE supplies it
Piping from one complete line

For a Beater Room, for instance, as for a bleach plant or boiler house, Crane can supply all piping equipment. One catalog gives you a complete and unequaled selection of valves, fittings, pipe and pipe line accessories. One order results in fastest possible service. For Crane supplies you through a cooperative network of well-stocked local Branches and Wholesalers, all backed by large factory stocks.

To standardize on **One Source of Supply**—when the source is Crane—is to simplify every piping procedure, from design to erection to maintenance. **One Responsibility** for materials helps you to get a better installation . . . on schedule. **One Standard of Quality** in every item from the broad Crane line assures uniform efficiency and dependability in every part of piping systems.

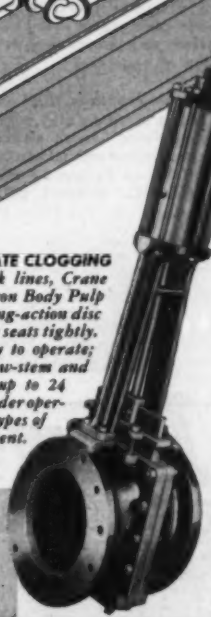
CRANE CO., 836 S. Michigan Ave.,
Chicago 5, Ill.
Branches and Wholesalers
Serving All Industrial Areas

ONE SOURCE OF SUPPLY
RESPONSIBILITY
STANDARD OF QUALITY



Beater room piping equipment from the complete Crane line.

TO ELIMINATE CLOGGING *of pulp stock lines, Crane recommends Iron Body Pulp Stock Valves. Shearing-action disc cuts through pulp fibers; seats tightly. Valve is self-cleaning; easy to operate; non-restricting to flow. Screw-stem and quick-opening patterns; sizes up to 24 in. Shown here, Crane air cylinder operated valve. Crane supplies all types of special valve operating equipment. See your Crane Catalog, p. 375.*



EVERYTHING FROM . . .

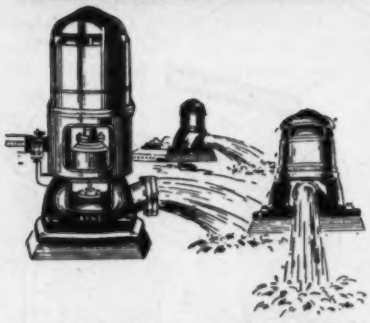
VALVES • FITTINGS
PIPE • PLUMBING
AND HEATING

CRANE

FOR EVERY PIPING SYSTEM

BIG OR LITTLE

They All Have the Same Layne Quality



Layne has constantly maintained the highest quality of materials and finest precision manufacturing in all of their Well Water System installations. The smallest are just as substantial in construction and as high in efficiency of operation and always produce proportionately as much water as the biggest. This fact has been proven time and again to the complete satisfaction of hundreds of owners.

When Layne builds a Well Water System, more than fine casing, impellers, shafting, motors and skillful manufacturing are used. Layne's reputation extending back over nearly three quarters of a century as the world's most capable well water developers is included.

All Layne Well Water Systems are equipped with the famous high efficiency Layne Vertical Turbine Pumps. These pumps are designed and manufactured exclusively in Layne's own plant where every detail of their construction and assembling is under the supervision of engineers.

Write for catalogs and information about Layne's complete service which includes surveys, water strata explorations, pump installations, etc., for a complete Well Water System. Address LAYNE & BOWLER INC., General Offices, Memphis 8, Tenn.

LAYNE WELL WATER SYSTEMS

AFFILIATED COMPANIES: Layne-Arkansas Co., Stuttgart, Ark. * Layne-Atlantic Co., Norfolk, Va. * Layne-Central Co., Memphis, Tenn. * Layne-Northern Co., Mishawaka, Ind. * Layne-Louisiana Co., Lake Charles, La. * Louisiana Well Co., Monroe, La. * Layne-New York Co., New York City * Layne-Northwest Co., Milwaukee, Wis. * Layne-Ohio Co., Columbus, Ohio * Layne-Pacific, Inc., Seattle, Wash. * Layne-Texas Co., Houston, Texas * Layne-Western Co., Kansas City, Mo. * Layne-Minnesota Co., Minneapolis, Minn. * International Water Corporation, Pittsburgh, Pa. * International Water Supply, Ltd., London, Ont., Can. * Layne-Hispano Americana, S. A., Mexico, D. F.

Safety . . . . . .

A GROUP PLAQUE AND individual awards for each member were presented at the Kalamazoo Paper Co. plant in Kalamazoo, Mich., to this electrical installation and repair crew. It was honored for 252,281 man-hours—130 months without a lost-time accident. Seated (L to R) are: Edwin G. Beznoska, Elvis L. Patterson and Harlan A. Kahl. Standing are: Lee Horton, Roscoe G. Bittenbender, Harry D. Jager, James A. Wise, vice president, who gave each man a savings bond on behalf of the company; Harry J. Leversee, Elliott P. Barber and John W. Gould, the latter Kalamazoo representative of the American Mutual Liability Co., which presented the plaque. Raymond Colloway and Ford Adams, other members of the crew, were on duty when the picture was taken. Frederick B. Curtenius, secretary-treasurer of the company, added his congratulations to those of Vice President Wise

SAFETY CONTEST SCORES

▶▶▶ THE PAPER INDUSTRY contest record for March (the 9th month of the contest) showed all reporting contestants with a frequency rate of 9.99, higher than the February rate of 9.06, but still better than the 8-month average rate of 11.49. This report given by the National Safety Council, also shows the better-than-average rate in March shaded the cumulative rate to 11.45 for the nine months, July to March. According to reports submitted for March, 26 contestants still show perfect scores—this figure includes 3 contestants that are below the minimum man-hour requirements (the 23 mills having the required man-hours are shown here).

Division I—Paper and Pulp Mills

Group A (None)

Group B (None)

Group C

Price Bros. & Co., Ltd., Jonquiere, Que., Canada.

Spaulding Fibre Co., Inc., North Rochester, N.H.

Certain-teed Products Corp., York, Pa.

Group D

Hollingsworth & Whitney Co., Madison, Me.

Container Corp. of America, Carthage, Ind.

Armstrong Cork Co., Pensacola, Fla.

Certain-teed Products, Richmond, Calif.

Mead Corp., (Wheelwright Div.), North Leominster, Mass.

Marathon Corp., Ashland, Wis.

Strathmore Paper Co., (Mill No. 1), Woronoco, Mass.

American Writing Paper Corp., (Albion Div.), Holyoke, Mass.

Fort Wayne Corrugated Paper Co., Vincennes, Ind.

National Gypsum Co., Newburgh, N.Y.

American Writing Paper Corp., (Mt. Tom Div.), Holyoke, Mass.

Division II—Paper and Board Remanufacturing

Group A (None)

Group B

Canadian Cellucotton Products Co., Ltd., Niagara Falls, Ont., Canada.

Group C

Marinette Paper Co., S. Glens Falls, N.Y.

Gaylord Container Corp., Tampa, Fla.

Pillsbury Mills, Inc., Wellsburg, West Va.

Thilmany Pulp & Paper Co., (Bag Mill), Kaukauna, Wis.

Certain-teed Products, Buffalo, N.Y.

Flintkote Co., Hollywood, Calif.

ABC Corrugated Box Co., Minneapolis, Minn.

Bay West Paper Co., Green Bay, Wis.

Continuing Thermal Research

NOW BRINGS YOU

GREATER HEAT TRANSFER CAPACITIES IN SMALLER, MORE COMPACT UNITS

OUT of the engineering department and research laboratory at Ross comes a steady flow of new manufacturing techniques and design improvements achieving continually higher levels of heat transfer efficiency and lower levels of cost per B. T. U.

Already widely known to primary equipment manufacturers and users are the tradition-shattering developments of the now famous Ross "BCF" line of exchangers. Now, of equal importance to practically every industry, comes news of the design changes to another of industry's favorites, the long established "CP" Exchanger — *another direct result of recent conclusions reached by continuing Ross thermal research.*

Having successfully accomplished the means of "cutting to the bone" ineffective areas, bypassing, eddies and excessive pressure drops, Ross now provides in the various sizes comprising the "CP" Exchanger line, *a greater heat transfer surface in a smaller, more compact unit.*

. . . and backing up these noteworthy performance developments are new manufacturing techniques as applied to the customary Ross mass production system of standardized parts manufacture. Closest practicable clearances between tubes and baffle holes, baffles and shell, and bundle and shell—*absolutely vital to complete, fully effective use of heat transfer surface*—are consistently and uniformly produced by new, precision, mass quantity manufacturing methods.

So, added to "CP" Exchangers' greatest asset — the custom assembly from mass produced standard parts — you now have more compact units embodying greater heat transfer capacity, to meet your individual requirements at lowest cost.

Ross Heater & Mfg. Co., Inc., Division of American Radiator & Standard Sanitary Corp., 1430 West Ave., Buffalo 13, N. Y. In Canada, Horton Steel Works, Ltd., Fort Erie, Ontario.

★ **DATA BACKS UP ALL CLAIMS: To find out how smaller "CP" clearances can make a high percentage difference in your heat transfer costs, write Ross today.**

ROSS "CP" EXCHANGERS

Serving home and industry

AMERICAN STANDARD • AMERICAN BLOWER • CHURCH SEATS • DETROIT LUBRICATOR • KEWANEE BOILER • ROSS HEATER • TONAWANDA IRON

Names in the News...

ALAN HELFFRICH RESIGNS AS GENERAL SALES MANAGER OF ST. REGIS PAPER CO.

The general sales manager of the Printing, Publication and Converting Sales Division of the St. Regis Paper Company, Alan B. Helffrich, resigned his position, effective April 15.

Mr. Helffrich is the current president of the Salesmen's Association of the Paper Industry, and has had 25 years' selling experience. One half of that time has been spent with the St. Regis Company. He says that he has no definite future plans except to take a well earned rest at his home.

▼

WALTHER & GOLDEN RETIRE FROM HINDE AND DAUCH CO.

Announcement has been made of the retirement of E. A. Walther, vice president in charge of production of Hinde and Dauch Paper Company, Sandusky, Ohio, after 43 years of service.

Howard Golden, general superintendent of factories for Hinde and Dauch, also has retired after 41 years of service.

▼

MANDO PROMOTIONS

The following organization changes have been announced by Minnesota and Ontario Paper Company, Minneapolis:

Robyn A. Campbell has been promoted from production supervisor to assistant sales manager for the paper division, and will be headquartered in Minneapolis. Affiliated with the paper industry for nearly 18 years, Mr. Campbell began his career at the Oxford Paper Company, Rumford, Maine, while attending Syracuse University. Later he was with the Container Corporation of America, the U. S. Gypsum Company, and Blandin Paper Company, Grand Rapids, Minnesota. He was associated with the latter company for ten years, and was its assistant manager prior to joining Mando in 1947.

Paul Joslin has been promoted to assistant sales manager for the paper division, with headquarters in Chicago. With the company for nearly 15 years, he has been manager of the paper division's Chicago sales office.

With the appointment of G. F. Hoppe to the position of Insulite sales promotion manager, George H. Alarik succeeds him as advertising manager for all operating divisions. Mr. Alarik was an account executive with the Melamed-Hobbs Advertising Agency, Minneapolis, prior to his association with Mando in 1948.

▼

▶▶▶ *A. C. Clarke* has become district sales manager in Atlanta, Georgia, for International Paper Company's Bagpak Division. He has been associated with the Division for many years in Chicago and Boston.

C. C. Crain will continue to operate out of Atlanta.

W. D. Peters, who has been in Atlanta, will join the sales organization of the head office in New York.

J. A. Groden, now connected with the head office of Bagpak in New York, will become district sales manager in Boston.

▼

MILAN BOEX HAS BEEN ELECTED PRESIDENT OF NORTHERN PAPER MILLS

The board of directors of Northern Paper Mills, Green Bay, Wisconsin, met on April 2 and elected Milan Boex president and general manager of the company.

For the preceding nine months, Mr. Boex had been acting as executive vice president and general manager following the death of the former president, the late A. B. Hansen.

Mr. Boex has been with the company for approximately 26 years, first as sales representative, later as general sales manager.

No other changes were made in the Northern Paper Mills organization as a result of the appointment of Mr. Boex as president. Herbert L. Nichols succeeded him as general sales manager last July.

▼

JOHN HUMPHREY MADE PRES. OF PHILIP CAREY MFG. CO.

At a recent meeting of the board of directors of the Phillip Carey Manufacturing Company, Cincinnati, Ohio, John W. Humphrey, formerly executive vice president, was elected to the presidency. He succeeds Robert S. King, who became chairman of the board, who, in turn, succeeded George A. Rentschler, who continues as chairman of the executive committee.

Mr. Humphrey has been with the Carey company since 1948. He has an outstanding business record in the field of business management, having been identified with a number of large nationally-known industrial companies.

L. W. Clarke, formerly general sales manager of the Carey company, was elected vice president in charge of sales. He succeeds E. W. Smith, who resigned.

▼

PENNSALT ELECTS OFFICERS

On the eve of its 100th anniversary year, George B. Beitzel has been elected president of Pennsylvania Salt Manufacturing Company. The new chief executive joined the company 19 years ago, and since January 1, 1949, has served as executive vice president.

Leonard T. Beale, president for the last 20 years, will continue with the company as chairman of the board.

At the annual meeting, the board also elected William P. Drake vice president in charge of sales, and William F. Mitchell vice president in charge of manufacturing. Mr. Drake assumes the position left vacant by Mr. Beitzel on January 1st when he became executive vice president. Mr. Mitchell succeeds Y. F. Hardcastle, oldest Pennsalt officer in point of service who retires from

Robyn A. Campbell

G. F. Hoppe

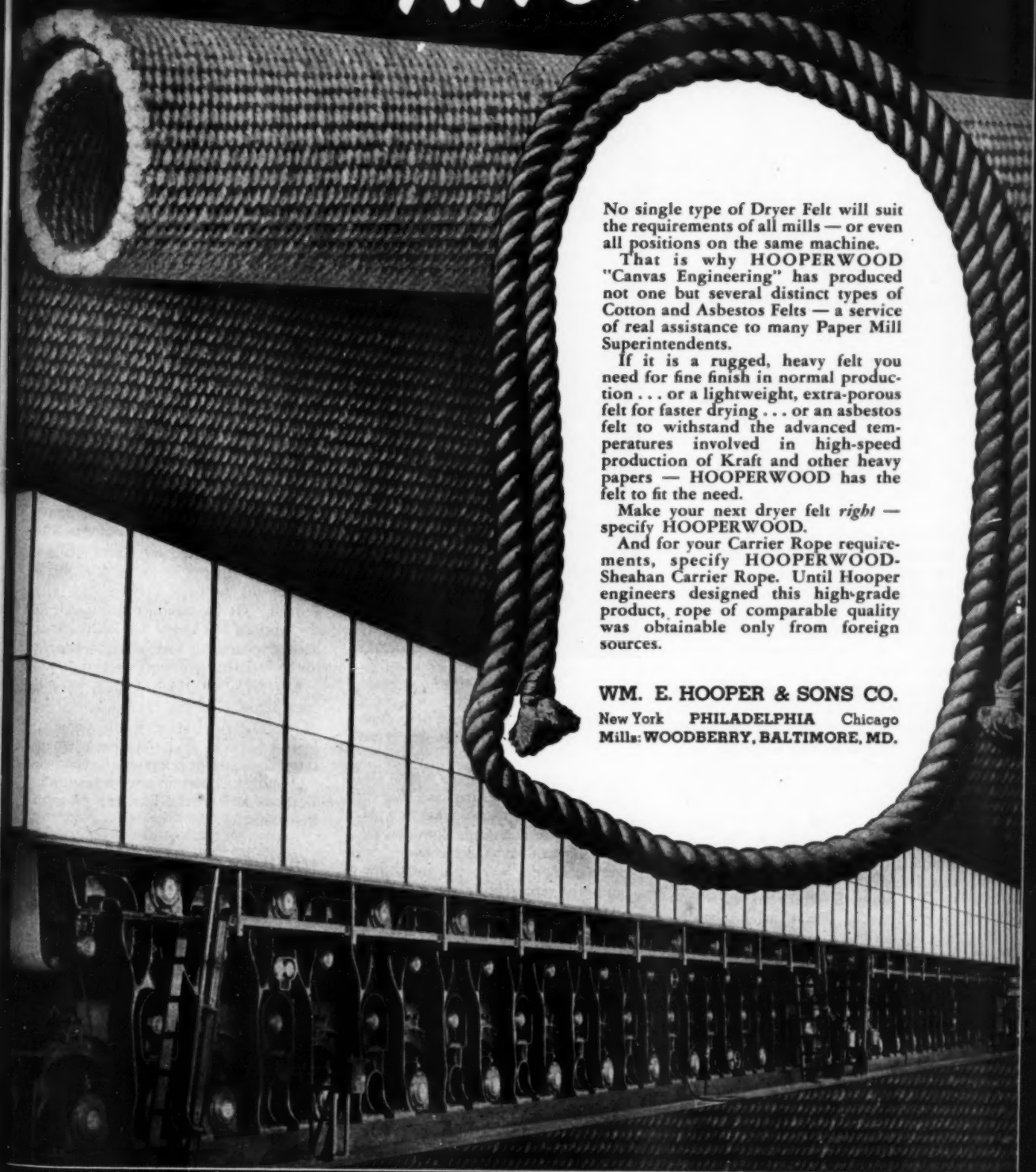
G. H. Alarik

Milan Boex

Geo. B. Beitzel

Wm. P. Drake

WHAT EVERY PAPER MAKER KNOWS...



No single type of Dryer Felt will suit the requirements of all mills — or even all positions on the same machine.

That is why HOOPERWOOD "Canvas Engineering" has produced not one but several distinct types of Cotton and Asbestos Felts — a service of real assistance to many Paper Mill Superintendents.

If it is a rugged, heavy felt you need for fine finish in normal production . . . or a lightweight, extra-porous felt for faster drying . . . or an asbestos felt to withstand the advanced temperatures involved in high-speed production of Kraft and other heavy papers — HOOPERWOOD has the felt to fit the need.

Make your next dryer felt *right* — specify HOOPERWOOD.

And for your Carrier Rope requirements, specify HOOPERWOOD-Sheahan Carrier Rope. Until Hooper engineers designed this high-grade product, rope of comparable quality was obtainable only from foreign sources.

WM. E. HOOPER & SONS CO.

New York **PHILADELPHIA** Chicago

Mills: WOODBERRY, BALTIMORE, MD.

HOOPERWOOD DRYER FELTS

COTTON AND ASBESTOS

active participation in the chemical company's operation, but will remain a member of the board.

Mr. Beitzel and Fred C. Shanaman, president of Pennsylvania Salt Manufacturing Company of Washington, wholly-owned West Coast subsidiary, were elected to two new directorships created at a recent meeting of the board. Mr. Shanaman also is a vice president of the parent company.

Mr. Beale first became associated with Pennsalt in September, 1923, when he was elected to the board of directors while serving as vice president of John T. Lewis & Bros. Company. Five years later he was elected president of Pennsalt, and it was under his leadership that the company made its most spectacular progress.

▼

HOOKER SALES PROMOTIONS

Three changes which took place in the sales staff of the Hooker Electrochemical Company, Niagara Falls, New York, resulted in the following promotions:

S. I. Anderson is now assistant to the general sales manager with responsibilities in both eastern and western sales activities. He was formerly assistant eastern sales manager. Associated with Hooker since 1933, he has previously been its midwest representative and midwest sales supervisor.

T. H. Trimble is now eastern sales supervisor. He has been a Hooker field salesman in several territories since 1934 including New York State, Pennsylvania, and the southeastern seaboard states.

Neil M. Barber, associated with Hooker since 1941, and a sales representative for New York State and western Pennsylvania since 1946, has been assigned to the area comprising eastern Pennsylvania and the southeastern seaboard states.

▼

▶▶▶ *Chester D. Jones, Jr.,* has been appointed purchasing agent of Diamond Alkali Company, Cleveland, Ohio. He will return to Cleveland from Houston, Texas, where he has served "on leave" since 1946 as plant purchasing agent during the construction and initial production period of the company's recently completed $14,500,000 electrolytic chlorine-caustic soda plant.

P. P. Eppinger succeeds Mr. Jones as purchasing agent of the Houston plant.

W. C. Logan moves up to the position of assistant purchasing agent in Cleveland.

W. C. Mahan also has been promoted to be assistant purchasing agent in the home office.

HARRY GENTZLER HONORED BY SCHMIDT & AULT FOR 50-YR. RECORD WITH COMPANY

A former country school teacher who turned to the trade of papermaking 50 years ago was honored on the eve of his golden anniversary on the job by his company and fellow employees at a special dinner given on April 11.

The man so honored, Harry E. Gentzler, started working for Schmidt

Harry E. Gentzler

& Ault Paper Company, York, Pennsylvania, on April 11, 1899. He is now 71 years of age.

The dinner in his honor was attended by more than 300 persons. On this occasion the company presented Mr. Gentzler with a radio, a lounge chair, floor lamp, and a smoking table. Several other gifts were presented by a committee representing the employees.

Mr. Gentzler began work in the paper mill as a helper in the company's beater room. He is now a paper machine tender.

▼

SALES DEPT. CHANGES MADE BY HAMMERMILL PAPER CO.

A number of reorganization changes in its sales department were made recently by the Hammermill Paper Company, Erie, Pennsylvania. George J. Smart has been made district sales manager and Gilbert P. Bothwell assistant district sales manager of the eastern territory, with headquarters in New York City. Both men were formerly in the Erie office. The former manager of the New York office, John E. Franzen, has been made manager of sales research, and will be on the staff at Erie.

Hammermill also has established a Chicago office to serve its midwestern territory, located in the One LaSalle Street Building. William W. Woodbridge is district sales manager of this territory; he is assisted by Glenn R. Spicer as district sales representative.

Harold B. Wilson as district sales representative is now assisting Harry R. Landers, district sales manager of the central sales territory. Mr. Wilson also continues as assistant advertising manager.

Robert F. McMahon is the new district sales manager of Hammermill's southern territory.

In other developments, Wilbur T. Eldredge has been named acting manager of product development; Douglas E. Hefferan, supervisor of safety paper sales; and John Studeny, supervisor of technical paper sales.

▼

MERLE SHAW HAS RETIRED FROM BUREAU OF STANDARDS

Completing thirty years of service with the Paper Section of the National Bureau of Standards, Merle B. Shaw announced his retirement as of April 1.

The paper industry is well acquainted with the work of Mr. Shaw during his term of service with the Bureau. He has conducted research in the work of the Paper Section that has been outstanding and of great benefit to the industry.

Mr. Shaw is widely known for his contributions to the literature. Some of this material has carried his personal by-line; much of it has been co-authored with other Bureau staff members and published both in government publications and in the business press of the industry.

▼

MATHIESON CHEMICAL CORP. ANNOUNCES PERSONNEL CHANGES

Several changes in the operating management of Mathieson Chemical Corporation have been made due to the increase in the number of plants recently acquired.

Dr. Carl F. Prutton has been made vice president-director of operations of all the company's plants, and Arthur T. Bennett, vice president, was placed in charge of the eight plants acquired from Southern Acid and Sulphur Company. R. B. Worthy and J. F. Newell have been made vice presidents.

Dr. Prutton, who joined Mathieson last year as director of research, will

West's Culture Assailed
As Soviet Schools Open
LONDON, Sept. 1—A new school year began in Russia today and Pravda, the Communist party newspaper, exhorted teachers to fill their students with "profound contempt for bowing and scraping before the bourgeois culture of the West."
A Pravda editorial, broadcast by the Moscow radio, said teachers had failed in the past to "reveal the advantages of the Socialist system" in history and geography lessons. It charged the teachers with "passing over in silence the priority of inventions and discoveries by Russian scientists."

Dear Soviet Teachers:

We note that you have been discreetly silent on some aspects of the Communist system. And that you have been urged by Pravda to fill your students with "profound contempt" for the admiration given to ours.

May we respectfully suggest a few more things that you'd better keep quiet about if you want the young Russians to grow up convinced Communists.

Don't tell them that in America the opportunity for advancement is unlimited—that here a man can work where he pleases and change his job when he pleases, and that he has the right to organize and bargain collectively.

Don't say anything about the competitive system, with rewards for initiative and enterprise in free markets—the same system which has produced a standard of living about ten times higher than yours.

Don't mention that here people can own things and manage their own businesses . . . and invest money in new undertakings.

Don't breathe a word about the American urge to invent better machines—and more productive ways to use them.

Don't refer to a dynamic way of life that keeps on turning out more and better goods—keeps on lowering costs and raising wages, with shorter working hours.

In other words, don't give them any of the facts about what happens when free people, governing themselves and spurred by ambition, go all-out to build a new kind of country—different from any the world has ever seen.

We don't say our way is perfect—far from it. We still have our ups and downs of prices and jobs. But we *know* what's wrong and we're free to *do* something about it. Change is our middle name. *And in the long run, our system always changes for the better.*

P.S. About that "priority of inventions," the point isn't whether the Russian scientist Lodygin invented electric light before Edison, but what happened *after* it was invented. Which system—yours or ours—has mass-produced for more people the daily benefits of such inventions as the automobile, telephone, radio, refrigeration, central heating, modern plumbing and better farm machinery? The world knows that it is *our* system!

John Q. Public, U. S. A.

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—How a still better living can be had for all

MAIL THE COUPON to Public Policy Committee, The Advertising Council, Inc., 25 West 45th St., New York 19, N. Y.

NAME_____

ADDRESS_____

OCCUPATION_____

have charge of research and supervise operations of all the company's plants, including those recently acquired. His headquarters will be in the New York offices. Dr. Prutton was formerly head of the Department of Chemistry and Chemical Engineering at Case School of Applied Science, a consultant to a number of chemical companies, and from 1942 to 1944 was chief of the Process Development Branch of the Office of Rubber Director and consultant to the War Production Board. He is the author of many scientific papers in the fields of chemistry and chemical engineering, holds many patents, and is a member of numerous scientific organizations.

Mr. Bennett, who will have his headquarters in Houston, Texas, joined the company in 1933 as a technical assist-

Dr. Carl F. Prutton *Arthur T. Bennett*

ant. He has subsequently been a department superintendent at the Lake Charles, Louisiana, plant, assistant manager at the Saltville, Virginia, plant, manager of operations in New York, and in 1946 was made vice president-manager of operations.

Mr. Worthy will be in charge of the plants acquired from Standard Wholesale Phosphate and Acid Works as well as of the Saltville, Virginia, plant where he has been manager. He has been with the organization since 1925, starting as an assistant engineer in the Saltville plant, and working up through various positions to that of manager of the Saltville operations.

Mr. Newell will remain at Lake Charles, Louisiana, where he has been in charge of the alkali and ammonia plants. With the company since 1931, he has been general superintendent of the Saltville plant, assistant manager of the Niagara Falls plant, and in 1944 became manager of the Lake Charles operations.

▼

▶▶▶ *Roscoe G. Robinson,* manager of duPont's Towanda, Pennsylvania, plant, has been named manager of the Defender photographic paper plant at Rochester, New York, succeeding Frederick B. Sackett. Mr. Robinson has been with duPont since 1929, and manager of the Towanda plant since 1947.

DUPONT ANNOUNCES THREE CHANGES IN TECH. DIV. OF ELECTROCHEMICALS DEPT.

Three personnel changes were announced recently in the technical division of the Du Pont company's electrochemicals department. These changes were effective May 1.

Dr. Paul R. Austin, assistant director of the chemical department laboratory at the Wilmington experimental station has been appointed director of the electrochemicals department's technical division.

Dr. Harold J. Barrett, chemical research manager at the Niagara Falls (N.Y.) plant has been named manager of field research with headquarters at Wilmington.

Dr. Campbell Robertson, manager of chemical research at the Perth Amboy (N.J.) plant, was named chemical research manager at the Niagara Falls plant.

▼

KING OF SWEDEN CONFERS KNIGHTHOOD ON GOTTESMAN

At an elaborate ceremony in the offices of the Swedish Consulate General in New York, D. Samuel Gottesman was invested with the insignia of the Swedish Royal Order of the North Star, with the rank of Knight, First Class, bestowed on him by King Gustav V of Sweden.

The order was founded in 1748 and is especially designed as a token of recognition of accomplishments in the field of literature and education. The award was bestowed on Mr. Gottesman particularly because of his establishment of the Gottesman Lectureship at the University of Upsala, Sweden.

▼

WALTER E. WINES MADE PAPER CONSULTANT FOR CHAS. T. MAIN, INC.

Announcement has been made of the appointment of Walter E. Wines (who retired on November 1st as manager of the mechanical department of the American Newspaper Publishers Association) as consultant to Chas. T. Main, Inc., Boston, in the preparation of studies, plans and specifications, and engineering supervision of newspaper, printing, and publishing plants.

The association of Mr. Wines with the company is in line with the policy of Chas. T. Main, Inc., to adequately cover the paper industry from raw materials through pulp and paper production to the conversion and use of the manufactured paper.

Mr. Wines entered newspaper work in 1899 when he was chosen to rebuild the Minneapolis (Minnesota) Tribune which had been destroyed by fire. In 1907 he went with Arnold Company, Chicago, and three years later became mechanical superintendent for the Chicago Tribune. Three years later, he became production manager for the New York Times. Following World War I, Wines became a member of the faculty of the University of Wisconsin. In 1926, he joined the American Newspaper Publishers Association and inaugurated their mechanical department, and in this connection during the next twenty-two years developed a body of literature on newspaper printing where little existed before.

Mr. Wines was a charter student at the Armour Institute of Technology when it opened in 1893. He was graduated in electrical engineering.

Walter E. Wines *Geo. S. Edwards*

GEO. EDWARDS APPOINTED TO COVER SOUTHERN TERR. FOR SWENSON EVAPORATOR

In order to give better service to its southern customers, the Swenson Evaporator Company (Division of Whiting Corporation), Harvey, Illinois, has appointed George S. Edwards sales engineer for the southern territory. He will make his headquarters in Birmingham, Alabama, and work out of the office of Whiting's southern manager, H. G. Mouat, at 544 American Life Building.

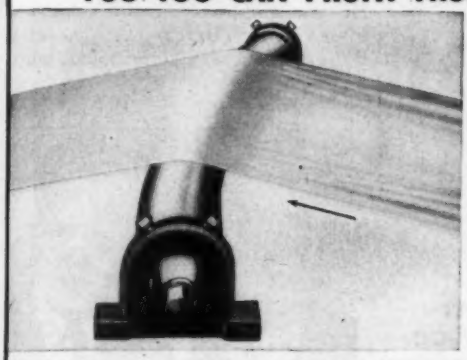
Mr. Edwards is a graduate of Iowa State College and has a B. S. degree in Chemical Engineering. For some years he was associated with the West Virginia Pulp & Paper Company, and later became pulp mill superintendent of its Williamsburg, Pennsylvania, plant. Since 1947, he has been in the employ of Swenson Evaporator Company, both as an engineer and salesman. He brings to his new assignment a practical knowledge of pulp mill operations.

▼

▶▶▶ *Frank Little's* appointment as merchandising manager of distributors products for Union Bag & Paper Corporation has been announced. Before joining Union Bag, Mr. Little was assistant to the vice president in charge of sales for Reynolds Metals Company, with which he had been connected since 1935.

MR. PAPER MAKER:

YOU TOO CAN PROFIT FROM WRINKLE-FREE — TROUBLE-FREE OPERATION



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MOUNT HOPE FREE WHEELING EXPANDER

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PERFORMANCE *Proved* FOR PULPWOOD HANDLERS

Today, more than ever before, reduction in operating costs is imperative.

Many of the world's largest Pulp and Paper Mills are relying upon Owen Grapples to handle a *greater volume* of pulpwood in *less time* at a *reduced cost.*

To learn how *you* can cut costs, write for the Pulpwood Grapple Catalog.

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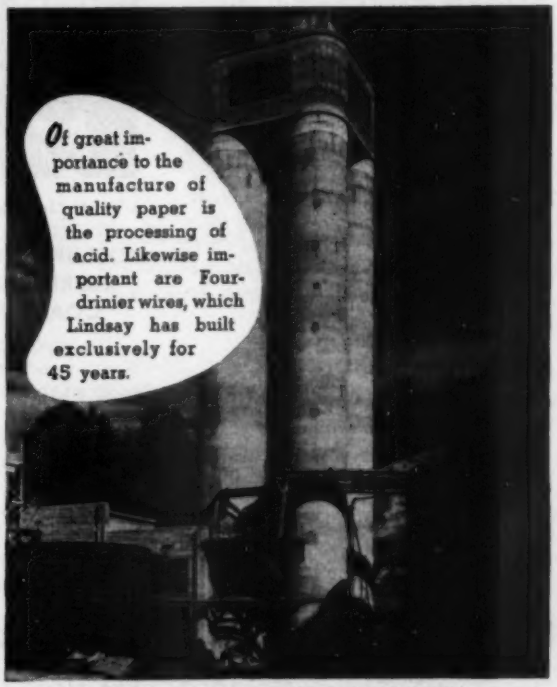
Of great importance to the manufacture of quality paper is the processing of acid. Likewise important are Fourdrinier wires, which Lindsay has built exclusively for 45 years.

THE LINDSAY WIRE WEAVING COMPANY

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Lindsay WIRES

FOR PAPER MILLS

MANDO PROMOTES OFFICIALS

Two new officers were elected at the recent meeting of the board of directors of the Minnesota and Ontario Paper Company, Minneapolis, Minnesota. Clarence Larson was made vice president in charge of production, and Hadlai Hull was elected secretary.

Clarence Larson

Hadlai Hull

Mr. Larson will supervise production operations in Mando's three mills from his headquarters in International Falls, where he has previously been general manager of the International Falls Division of Mando. Since joining the company in 1920, Mr. Larson has advanced through many positions of increasing responsibility, which have given him valuable experience and a thorough understanding of the production problems involved in manufacturing both paper and Insulite.

Mr. Hull joined Mando in 1946 as assistant secretary and has held this position until his recent election as secretary.

▼

▶▶▶ *Lawrence F. Welk*, manager of the St. Regis Paper Company's multiwall bag plant at Nazareth, Pennsylvania, has been appointed branch manager of the company's multiwall bag plant at Oswego, New York. He succeeds Norman K. Charlton, who has resigned.

▼

EXECUTIVE PERSONNEL OF DOW CHEMICAL CO. SHIFTED

The executive personnel of the Dow Chemical Company, Midland, Michigan, was shifted at a meeting of the board on April 5, following the death of the late president, Dr. Willard H. Dow, on March 31.

Leland I. Doan, who has been director of sales, was elected to the presidency. Donald H. Williams was promoted from general sales manager to succeed Mr. Doan. The position of general sales manager will be filled by Donald K. Ballman, who has been assistant general sales manager. Dr. L. S. Roehm, who has been in charge of Dow's technical service and development division, will continue in that position; he also will take over the duties of assistant general sales manager.

In addition to his duties as president, the late Dr. Dow had served as chairman of the board and general manager. Earl W. Bennett, who has been chairman of the finance committee has been given the additional office of board chairman. A. P. Beutel and Russell L. Curtis were given newly-created posts as vice presidents. Dr. Mark E. Putnam was named general manager and a member of the executive committee.

▼

JOHN W. M. JAMIESON IS THE NEW GEN. SUPT. AT ORR FELT & BLANKET CO.

The new general superintendent of Orr Felt & Blanket Company, Piqua, Ohio, is John W. M. Jamieson, who assumed his new duties on April 11.

Born in Scotland, Mr. Jamieson came to America in 1924, and was for a time connected with Horner Brothers Woolen Mills at Eaton Rapids, Michigan. For 22 years he has been associated with Penmans Ltd., St. Hyacinthe, Quebec, in charge of the manufacture of papermakers' felts and tweed materials.

J. W. M. Jamieson

John Roslund

ROSLUND APPOINTED AS REPRESENTATIVE ON PAC. COAST FOR DOWINGTOWN

The appointment of John Roslund as West Coast representative was announced recently by the Downingtown Manufacturing Company, Downingtown, Pennsylvania. He has for a number of years represented the Asten-Hill Manufacturing Company, and previous to that had many years of experience in the design and application of paper mill machinery.

Mr. Roslund is a graduate mechanical engineer, a member of TAPPI and of the Superintendents Association.

▼

▶▶▶ *David G. Stenberg* has been appointed head of the Chicago district sales office of the National Gypsum Company, Buffalo, New York. He was formerly in the Buffalo sales office of the company, and has been with the firm for 10 years.

▶▶▶ *Anton Siebers* of Longview, Washington, has been named paper mill superintendent of the new Weyerhaeuser mill at Springfield, Oregon. He was employed by the Longview Fibre Company for more than 20 years, being paper mill superintendent when he resigned in May, 1948.

A. P. Siebers

Dr. J. M. Newton

NEW POSITION AT CLINTON GIVES BROADER SCOPE TO DR. NEWTON'S RESEARCH

Research supervisor for Clinton Industries, Inc., Clinton, Iowa, Dr. J. M. Newton, has been appointed director of the company's technical sales service department. In his new post, Dr. Newton will supervise the basic and applied research, pertaining to sales, required to meet the growing demands for special service by customers with technical problems. Industrial users, including paper manufacturers, are continually seeking new adaptations for corn products in the interest of economy and efficiency, and the function of the technical sales service department will be to supply the information essential to such new applications.

Dr. Newton majored in carbohydrate and enzyme chemistry while obtaining his doctorate at Iowa State College, Ames, in 1941. He joined Clinton Industries that year as a research chemist, and in 1947 become research supervisor, directly supervising research on starch, dextrins, and lactic acid.

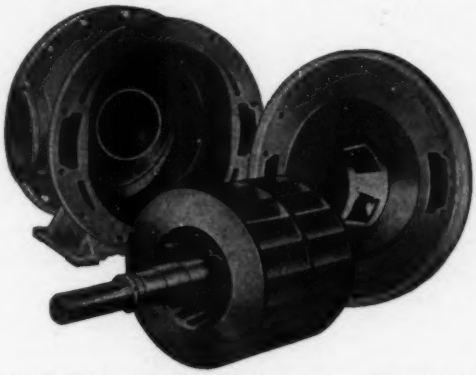
▼

JOHN RANKIN & PERCY FOX GIVEN NEW APPOINTMENTS

Announcement was made recently of the appointment of John L. Rankin to the posts of president of the St. Lawrence Corporation, Ltd., Montreal, Quebec, Canada, and chairman of the board of the two associated companies, St. Lawrence Paper Mills Company, Ltd., and Lake St. John Power and Paper Company, Ltd. He was previously president of the St. Lawrence Paper Mills and the Lake St. John Company, and vice president of the corporation.

Percy M. Fox was simultaneously appointed president of the two associ-

SIMPLICITY



NASH VACUUM PUMPS HAVE ONE MOVING PART

Operating advantages made possible by the Nash principle, and present in no other type of vacuum pump, permit a new level of operating economy. Nash Vacuum Pumps have but one moving part, a rotor cast in one piece, and revolving without metallic contact. There are no valves, no pistons or sliding vanes, no internal parts requiring wear adjustment or lubrication.

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SOUTH NORWALK, CONNECTICUT, U. S. A.

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Photoelectric REFLECTION METER

For accurate measurement of

BRIGHTNESS
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OPACITY
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of paper and paper products.
Portable, rugged, simple to operate.

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PMAS SLIME CONTROL

. . . STABLE, ECONOMICAL ODORLESS, CONVENIENT, LABOR-SAVING

PMAS, as a slime control agent, combines advantages that have not heretofore been found in one material for this purpose. Summed up, they are as follows:

1. **Stability**—PMAS is a stable water solution, containing 10% Phenyl Mercuric Acetate made soluble in an organic complex. There is no possibility of entrainment.

2. **Economy**—PMAS provides complete control of slime at a cost usually under 10 cents per ton of paper.

3. **Convenience**—PMAS can be fed into the system with continuous automatic equipment, directly from the shipping container.

4. **Suitable for Food Paper**—PMAS is completely odorless and is nontoxic in the dilutions recommended.

5. **Reduced Machine Breaks**—Adequate slime control reduces paper breaks on the machines. Some mills report reduction in breaks of over 95%.

6. **Reduced Clean-Up Time**—Paper mills adopting PMAS for slime control, report decreases in clean-up time amounting to as much as 80%.

Let our representative study your requirements.

W. A. CLEARY CORPORATION
NEW BRUNSWICK, NEW JERSEY

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Belleville, Ontario

ated companies. He has long been associated with the St. Lawrence group of companies, of which he is a director, and was formerly vice president and general manager.

A. Kirk Cameron, president of the St. Lawrence Corporation, and chairman of the board of the two subsidiaries, is retiring, but he will remain as a director of the group of companies.

▼

CARSWELL & VAYO MADE VICE PRESIDENTS OF ST. REGIS

Recently elected to the vice presidency of the St. Regis Paper Company, New York, were Arch Carswell and Reginald L. Vayo.

Mr. Carswell, who joined the company in 1928, became general sales manager of the Multiwall Bag Division, with headquarters in New York, early in 1948. Prior to that he had been Pacific Coast manager of the Division. He will continue in charge of sales for the Division.

Mr. Vayo, who joined the company in September, 1945, to take charge of pulp sales, had previously been manager of the foreign department of Brown Company and Brown Corporation. He was named to the War Production Board in May, 1942, serving as chief of the Lend-Lease Division of the Allocation Office, Forest Products Bureau until July, 1943, when he rejoined the Brown Company. In March, 1943, he was recalled to the WPB as a "dollar-a-year man." Mr. Vayo will now direct sales of kraft paper and board as well as pulp.

▼

▶▶▶ *Marc Rolland,* manager of the Rolland Paper Company, Ltd's mill in Mont Rolland, Quebec, Canada, has been elected a director of the company.

▼

▶▶▶ *Bertram E. Claridge,* vice president of Hammermill Paper Company, Erie, Pennsylvania, has been appointed to the newly created committee on timber, soil, and water conservation of the National Association of Manufacturers.

▼

EXECUTIVE PROMOTIONS AT W. A. JONES FDRY. & MACH.

Important executive promotions have taken place at the W. A. Jones Foundry and Machine Company, Chicago. Joseph A. Marland, who has been handling sales in the Chicago territory, has been made sales manager. He has been with the company since 1926. Thomas A. Jones has been appointed assistant sales manager and Joseph A. Guyer, advertising manager.

Mr. Marland is a native of Pennsylvania, but received his engineering education at Armour Institute, Chicago, and Ohio State University. His specialty has been the application of speed reducers and transmission products.

Thomas Jones, who entered the Jones organization following his graduation from Yale in 1940, has been secretary and personnel manager. He will continue his duties as secretary in addition to taking on the work of assistant sales manager. He is one of the grandsons of W. A. Jones who started the business in 1890.

Joseph Guyer has had estimating, engineering, sales and advertising experience with the Jones organization, which he entered in 1929, after completing a general engineering course at the University of Illinois. He is particularly fitted to produce Jones's technical catalogues.

J. A. Marland

Thomas A. Printon

THOMAS PRINTON MADE PRESIDENT OF NOPCO— GULICK HEADS BOARD

The board of directors of Nopco Chemical Company, Harrison, New Jersey, recently elected Thomas A. Printon as president. He succeeds Charles P. Gulick, one of the company's founders and its president since 1932. Mr. Gulick will continue as chairman of the board.

Mr. Printon has been a director of the company since 1936 and a vice president since 1938. A graduate of Boston College, he joined Nopco in 1922 as a salesman.

▼

▶▶▶ *G. J. Ticoulat,* sales manager of the Crown Willamette Paper Company, has been elected president of the San Francisco Sales Manager Association for 1949.

▼

▶▶▶ *Jay W. Pickett* is now district sales manager of the southeastern district of E. C. Atkins and Company, Indianapolis, Indiana. His headquarters will be in Atlanta, Georgia. Mr. Pickett was employed by Atkins in 1919 as a clerk, and shortly thereafter was promoted to assistant manager of the Atlanta branch. In 1940, he joined the company's sales force.

▶▶▶ *John E. L. Duquet* was recently elected vice president of the St. Lawrence Paper Mills Company, Ltd., and Lake St. John Power & Paper Company, Ltd., Montreal, Quebec.

Noah A. Timmins, Jr., was also elected a vice president of the same companies.

George A. Jacques has been made general manager of these companies.

▼

▶▶▶ *Robert L. Baldwin* has been appointed assistant to G. A. Wallerstedt, western district manager for Hardinge Company, Inc. (York, Pennsylvania). Mr. Baldwin will assist in sales development, using the Hardinge office at 24 California Street in San Francisco as headquarters. He left the position of sales development manager of the Electrode Division of the National Carbon Company this year to join the Hardinge organization.

▼

▶▶▶ *Robert H. Evans,* secretary of the Riegel Paper Corporation, was elected a director at the annual meeting held April 26 in Riegelsville, New Jersey.

Ward Harrison, manager of production, was also elected to the board of directors at the meeting. The stockholders, following the meeting, toured the company's Warren and Milford mills.

▼

▶▶▶ *F. H. Werling* has been appointed manager of the Lakeview Mill of the Kimberly-Clark Corporation, Neenah, Wisconsin.

J. C. Wollage, former manager of the mill, has been added to the technical department.

A. D. Wilkinson has been appointed production manager of the company's mill at Kimberly, Wisconsin.

▼

▶▶▶ *J. G. MacDermot* has been appointed vice president of Monsanto (Canada) Ltd., at Vancouver, British Columbia.

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▶▶▶ *Orin R. Summerville* has been named to the post of vice president and sales manager of the Brownville Paper Company, Watertown, New York, effective July 1, as successor to the late Seymour M. Jones. At present, Mr. Summerville is vice president of the Beckett Paper Company with offices in New York City, and is in charge of eastern sales for that firm.

▼

▶▶▶ *P. G. Martin* has been elected vice president and sales manager of The Thompson Folding Box Company, Ltd., Toronto, Ontario.

"JOHN CRANE" CHEMLON FOR ALL CHEMICAL SERVICES

"Chemlon packing on reciprocating and rotary pumps with 50% concentrated H_2SO_4 has been very effective for the past ten months"—"Ten times more efficient than any previous packing for viscous di-acetone dope."

These reports on the revolutionary new "John Crane" chemically inert packing are typical. Engineers are finding that Chemlon lasts longer on all chemical services. Why don't you pack a pump or small valve and see its efficient performance for yourself?

There's an interesting new free booklet available—describing Chemlon in detail.

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MADE BY

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ORISKANY, N. Y.

Toilet Roll and Towel Roll Wrapping Machines - - - Banding Equipment

Write for complete information

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Sandy Hill

IRON & BRASS WORKS

PAPER MACHINERY SPECIALISTS • HUDSON FALLS, N. Y.

BUILDERS OF SANDY HILL, BERTRAMS AND KAMYR EQUIPMENT

Murco

ROLL HEADING MACHINE

CUTS FINISHING ROOM COSTS · PRODUCES NEATER ROLLS · IMPROVES APPEARANCE OF ROLLS

Here's equipment that will solve your heading problems—if you ship paper in rolls. It is a simple versatile machine that will turn out uniform perfectly headed rolls—at a fraction of the cost of hand heading—and without tipping rolls on end.

If you want your paper to create a better impression at first sight, investigate this machine today. We will submit a proposal to best meet your requirements.

This machine may be used as:

1. A plain heading machine only . . . with steam or electrically heated platens.
2. A heading machine mounted directly on scale as a unit.
3. A plain heading machine mounted on a scale—all on a transfer car, to service more than one paper machine.
4. A heading machine only on car.
5. Any conceivable combination of units, to meet almost any range of diameters and lengths.

D. J. MURRAY MANUFACTURING CO.

WAUSAU • WISCONSIN

ERNEST L. ABRAMSON NOW WITH AURORA PUMP CO.

A development engineer with twenty years experience in the development and design of turbine-type pumps, Ernest L. Abramson, has become associated with the Aurora Pump Company, Aurora, Illinois.

Mr. Abramson will participate in a broad development program involving new designs, new sizes and new applications for Aurora centrifugal and Apco turbine-type pumps.

E. L. Abramson

W. L. Rippeteau

RIPPETEAU APPOINTED MGR. WYANDOTTE DEVELOPMENT

Announcement was recently made of the appointment of W. L. Rippeteau as manager of development for the Wyandotte Chemicals Corporation, Wyandotte, Michigan.

Mr. Rippeteau joined Wyandotte Chemicals in 1947 as a contact representative for the new organic and inorganic products being produced by the company. Following his graduation from the University of Kansas in 1939, he was employed by Phillips Petroleum as a research and development engineer. During World War II he was in the Production Engineering Branch of the Technical Division of the office of the Chief of Chemical Warfare Service.

▼

▶▶▶ NEW AGENTS have been appointed by D. J. Murray Manufacturing Company, Wausau, Wisconsin, as distributors of GRID unit heaters and allied products in their respective territories: I. Ernest Shaer, 161 Devonshire Street, Boston 10, Massachusetts; G. T. Pottinger & Company, 2475 Rivers Road, N. W., Atlanta, Georgia; The Jordan Engineering Company, Traction Building, Cincinnati 2, Ohio; Lefler Wyomont Supply Company, P. O. Box 1266, Casper, Wyoming.

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▶▶▶ *William G. Reed,* president of Simpson Logging Company, Shelton, Washington, has been elected a director of Rayonier, Incorporated, New York, New York. Rayonier's president, Edward Bartsch, stated that the company's directorate had been greatly strengthened by the election of Mr. Reed, because of his years of experience in the Northwest's logging and lumber business.

▼

▶▶▶ *Edward L. Lockman* was recently appointed manager of tank lining and roll covering sales for the United States Rubber Company, New York. A graduate of Massachusetts Institute of Technology, Mr. Lockman has spent 15 years with the rubber industry. In 1934, he joined U. S. Rubber as a salesman, and in 1938 became assistant sales manager of roll covering and tank lining.

▼

▶▶▶ *A. T. Davis,* assistant to the manager of the Manufacturing industries division of the apparatus department, General Electric Company, Schenectady, New York, has retired after 42 years' service. During his career with G-E, Mr. Davis was actively associated with the pulp and paper and textile industries, especially in his capacity as assistant to W. W. Cronkhite and K. R. Ross.

Necrology . . . . . .

WILLIAM J. NORTON

Connected with the American Writing Paper Corporation, Holyoke, Massachusetts, and its predecessor corporations for 34 years, William J. Norton, treasurer and director of sales promotion and advertising of the Eagle-A organization, passed away April 27.

Mr. Norton joined the organization in 1915 as assistant advertising manager. Later he transferred to the sales department, and for a time was secretary to Sidney L. Willson, late president of the company. He was elected assistant secretary of the company in 1927 and treasurer in 1929. The widow and one daughter survive him.

▼

▶▶▶ *Robert F. Paviour,* manager of the envelope department of Alling & Cory Company, Inc., (Rochester, New York) for 38 years, passed on April 13. He had been a director of the corporation since 1939. He was 62. A graduate of the University of Rochester in 1908, Mr. Paviour joined the sales staff of the Rochester Division of Alling & Cory in 1909. When the Buffalo Division opened in 1911 he was sent there as envelope department manager.

▼

HERMAN A. KRENKEL

A retired general superintendent of the Kimberly-Clark Corporation plant in Niagara Falls, New York, Herman A. Krenkel, passed away at his home April 3. He was 71 years of age.

Born in Germany, Mr. Krenkel joined Kimberly-Clark at the Kimberly, Wisconsin, plant on April 27, 1892, as a member of the paper machine crew. He later became foreman, and in 1921 went to Niagara Falls as superintendent of Mill No. 1, retiring on July 1, 1940.

▼

▶▶▶ *Arthur Joseph Wilson,* traffic manager for the Ontario Paper Company, Thorold, Ontario, Canada, passed away April 13 while on a business trip. He was 63. He had been a leader in the pulp and paper business for many years. His widow and two sons survive.

▼

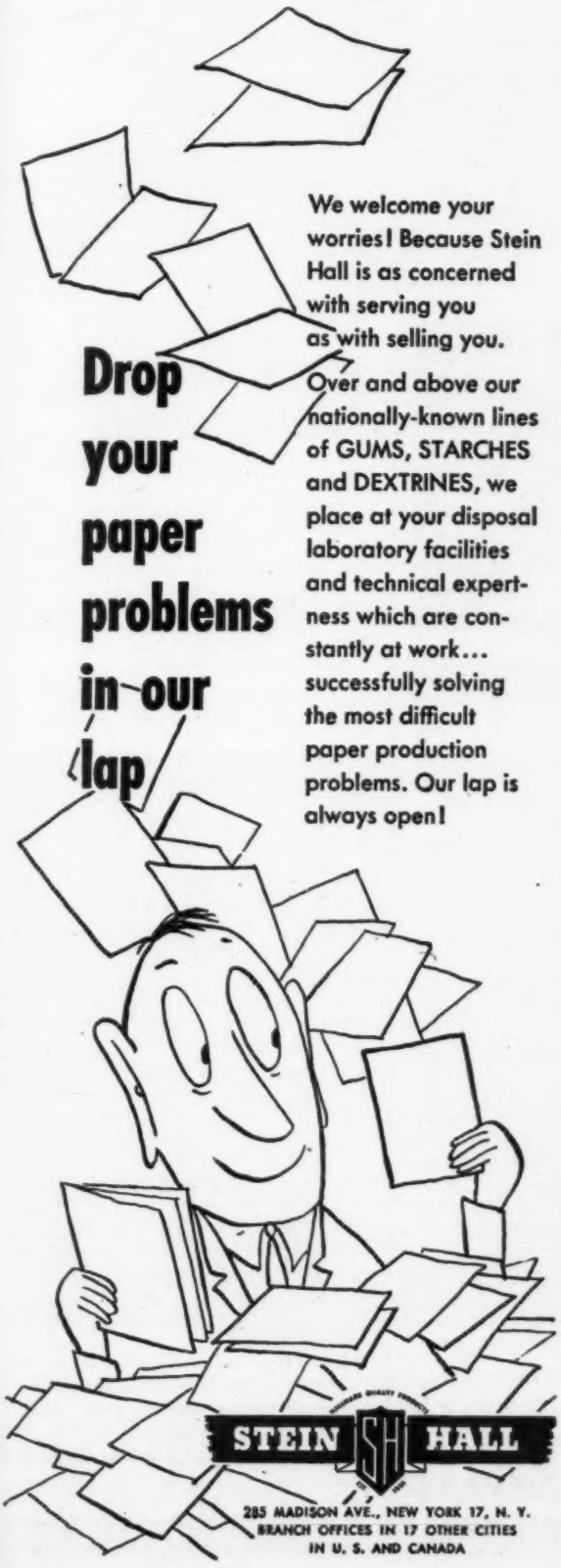
▶▶▶ *C. Neal Barney,* vice president, secretary, and general counsel of Worthington Pump and Machinery Corporation, New York, passed away at his home in Scarsdale, New York, April 24, at the age of 73 years. Mr. Barney joined Worthington as chief counsel and secretary in 1918; was appointed secretary-treasurer in 1932; and elected vice president and secretary in 1942.

▼

EARLE CALDER DUFFIN

The former president of the Bowater Paper Company of New York City, Earle Calder Duffin, passed away in London, England, at the age of 62. (The New York firm was formed to market in this country products made in Newfoundland.)

A Canadian by birth, Mr. Duffin was for a number of years with the Bowater firm as its New York representative. In 1929, he became sales director of the various Bowater Company interests in England, and in 1939 was made di-



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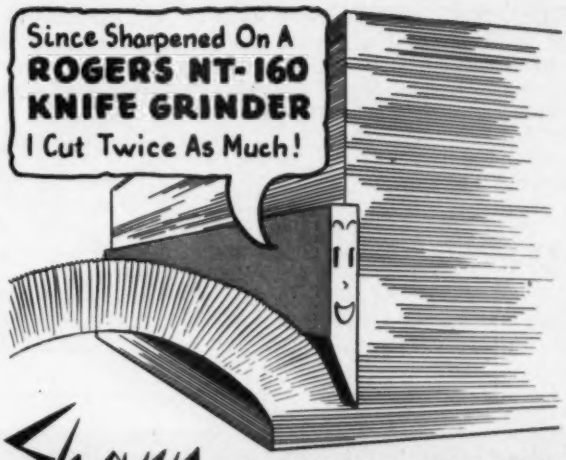

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rector of newsprint in London under the paper rationing plan. He was a member of the rationing committee of the Newsprint Supply Company, agency for newsprint distribution in Britain.

He is survived by the widow, a daughter and a son.

▼

▶▶▶ *C. B. Clark,* president of Riverside Paper Company, Appleton, Wisconsin, and a director of the Kimberly-Clark Corporation, Neenah, Wisconsin, passed away the week of April 3 while vacationing at Palm Beach, Florida. He was 66 years old. His father was one of the founders of the Kimberly-Clark Corporation.

▼

EINAR SORENSEN

Former superintendent of the electro-chemical plant of the Oxford Paper Company mill at Rumford, Maine, Einar Sorensen, passed away April 1.

Mr. Sorensen was known for the improvements he made in the electrolytic cell, now patented as the Sorensen call, and known by that name in the pulp and paper industry and in much of the technical literature of the industry. A native of Norway, Mr. Sorensen came to the Oxford Paper Company from Berlin, New Hampshire, April 1, 1911, and worked his way up to the position of superintendent, which he held from 1918 to April 1, 1946, when he retired.

He is survived by his widow, two sons, and a daughter.

▼

HARRY MIX HOOKER

The former president of the Hooker Electrochemical Company, Niagara Falls, New York, Harry Mix Hooker, 76, passed away in that city April 9. He was president of the company from 1938 to 1945, and was chairman of the board until his retirement in February of this year. He had been connected with the Hooker Company for 36 years, becoming its second president following the death of his brother, Elon H. Hooker, in 1938.

He had also been a director of the Power City Trust Company, and was associated with the National Association of Manufacturers, National Industrial Conference Board, the Chlorine Institute, the Compressed Gas Manufacturers Association, and the U. S. Alkali Export Association.

▼

▶▶▶ *Frederick J. Babcock,* former superintendent of the Dexter Sulphite and Paper Company mill in Dexter, New York, passed away April 14, at the age of 77. He was superintendent of the mill for 25 years prior to his retirement.

▼

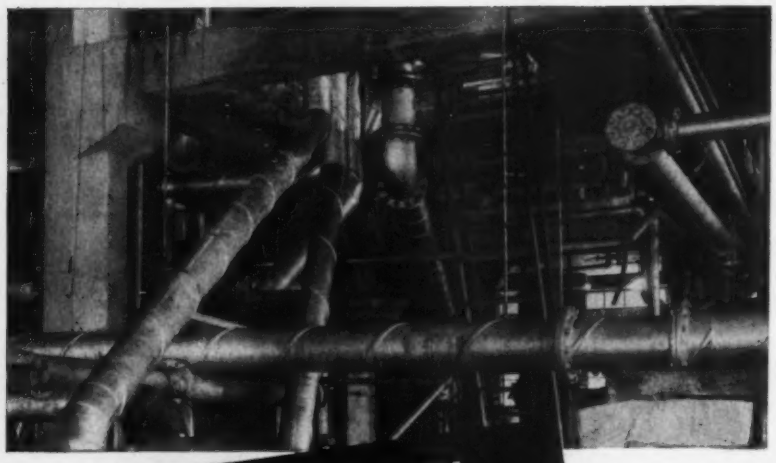
▶▶▶ *Grafton Houston,* vice president of the Gilman Paper Company, passed away April 10 in New York City at the age of 53. He was a native of San Antonio, Texas. Surviving are his widow, a son and daughter.

▼

▶▶▶ *Harold E. Darling,* superintendent of the coating and finishing department of the Falulah Paper Company, Fitchburg, Massachusetts, passed away in that city April 11. He was 52 years old and had lived in Fitchburg for 25 years. He is survived by the widow and two sons, Harold W. Darling and Donald R. Darling.

▼

▶▶▶ *Raymond N. McAdams,* former secretary of the Hercules Powder Company, Wilmington, Delaware, passed away April 9, at the age of 65. He joined Hercules at the time of its organization in 1913 as chief clerk of the works accounting division; he was named assistant treasurer of the company in 1926, and secretary in 1941.



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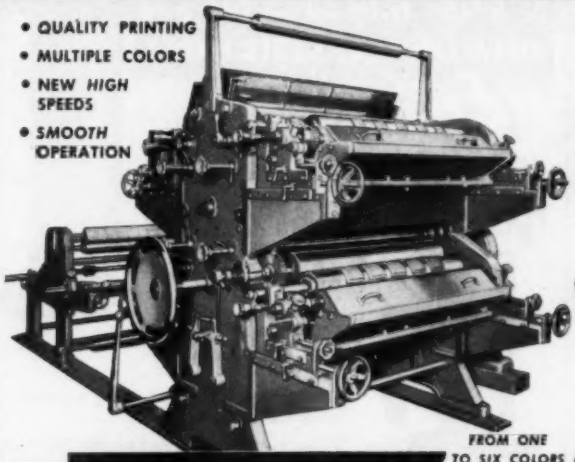

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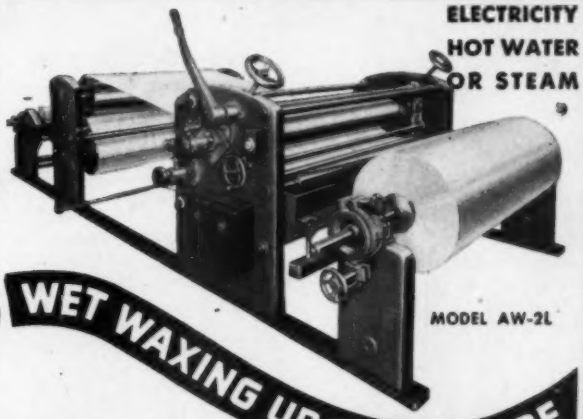

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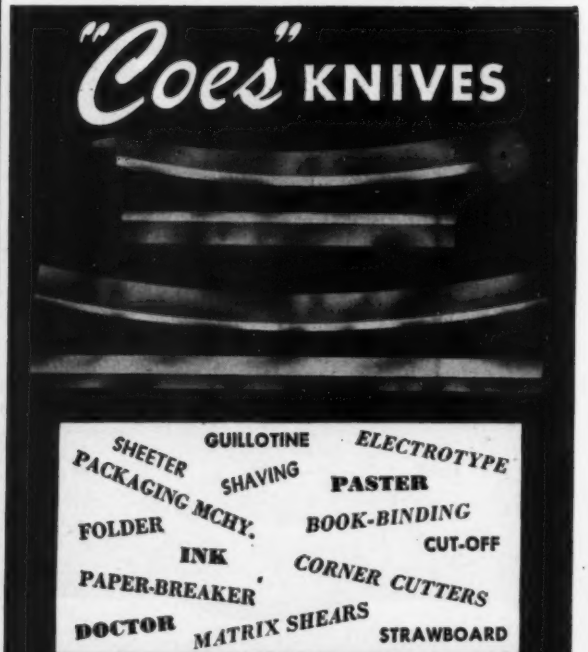

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How To Check Engine Flywheel And Flywheel Housing For Trueness

The following indicator readings deviate from S.A.E. recommendations slightly; on some surfaces more liberal, on others closer. These are practical field service recommendations. Generally speaking adhering to S.A.E. will be satisfactory. The value of the diagrams is in the pictorial presentation of the placement of the indicator. In this case a picture is shorter and clearer than words.

1. Clean flywheel and housing thoroughly
2. Bolt the thousandths indicator or gage to flywheel so it is perpendicular to the housing face, and indicator stem is riding on the flywheel housing face (Figure 1)
3. The maximum deviation of the face of the flywheel housing flange from its true position when the flywheel is rotated on its axis, shall be 0.005 in. Total indicator runout 0.010 in.
4. Then readjust indicator so that the stem will ride on the bore of the flywheel housing flange (Figure 2)
5. The maximum eccentricity of the bore of the flywheel housing shall be 0.005 in. Total indicator reading 0.010 in.
6. Remove indicator bracket from flywheel, and bolt indicator to flywheel housing and check flywheel runout
7. The maximum variation of the surface to which the driving ring or clutch plate is bolted shall be 0.0025 in. Total indicator runout 0.005 in. (Figure 3)
8. The maximum eccentricity for the pilot in the flywheel which pilots the driving ring or clutch plate shall be 0.0025 in. Total indicator runout 0.005 in. (Figure 4)
9. With indicator bolted to the flywheel housing, check eccentricity of pilot bearing bore in the flywheel. The maximum eccentricity for the bore in the flywheel for the pilot bearing shall be 0.0015 in. Total indictor runout 0.003 in. (Figure No. 5)
10. The tolerance for the flywheel housing bore shall be plus 0.005 in. and minus 0.000, except for the No. 0 and 00 sizes which shall be plus 0.010 in. and minus 0.000. — GEORGE PHIEL, Engineer, Twin Disc Clutch Co., Racine, Wis.

▼

How to Find the Required Horsepower

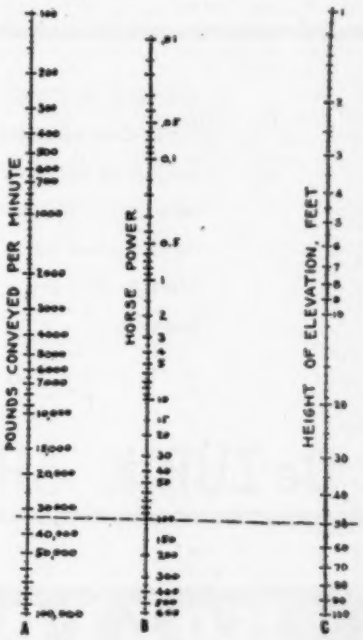
In one simple operation, the accompanying chart tells the horsepower required to drive the average conveying machinery for handling different materials—coal, grain, gravel, dirt, ashes, cement, rock, sand, etc.—anything that is handled and elevated by machinery.

Just lay a straightedge from Pounds Conveyed Per Minute, Column "A," to the Height of Elevation, Column "C," and the horsepower is immediately found in the intersection with Column "B."

For example, the dotted line drawn across this chart shows that where 33,000 pounds of material are conveyed per minute, the height of elevation being 50 ft, Column "B" shows that 100 hp is the average requirement for power.

In the event that you know the efficiency of your conveyor—which may be better or poorer than the average—do this: Divide 50 by the known efficiency of your conveyor and then multiply the quotient by the horsepower obtained in Column "B."

Thus, for example, let us say that you want to convey 33,000 pounds of material to a height of 50 ft, which is the same problem as above. But the efficiency of your



conveyor is 80 per cent. We then have this: 50 divided by 80 equals 0.625. Multiplying the 100 obtained in Column "B" by 0.625 we get 62.5 hp as the power required to do the work.

It will be noticed that the range of the chart is great enough to take care of most drives—from a hundredth of a horsepower to 600 hp. Any able-bodied man can do a hundredth of a horsepower easily. However, 600 hp is considerable power. It isn't often that 600 hp is devoted to the conveying of materials alone.—W. F. SCHAPHORST, M.E.

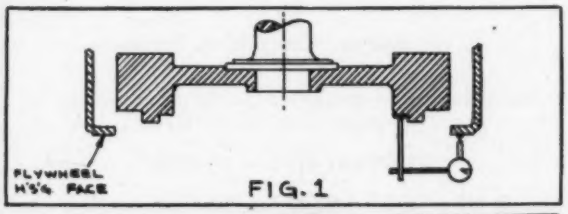


FIG. 1

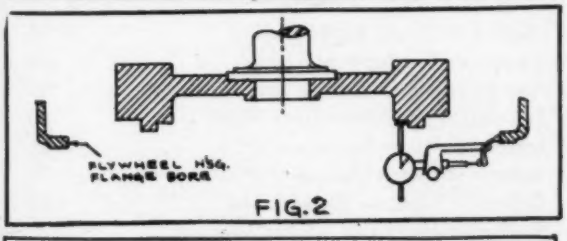


FIG. 2

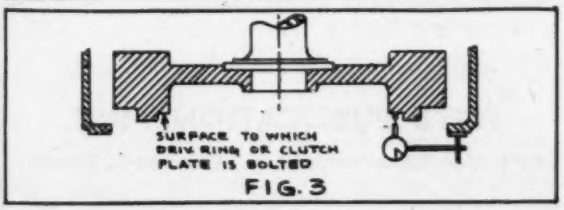


FIG. 3

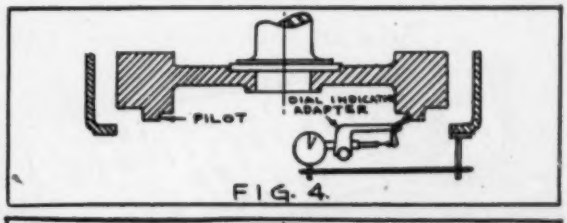


FIG. 4

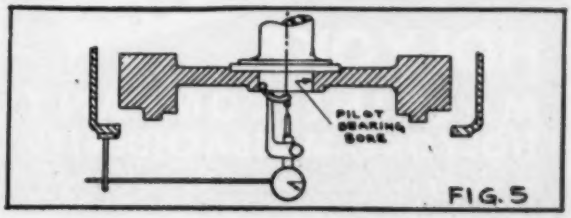


FIG. 5

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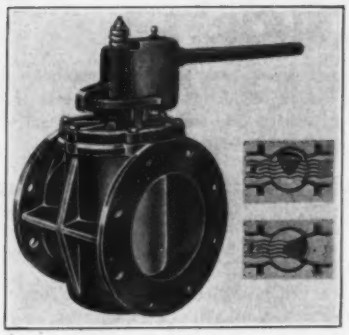

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International Review.....

News from Other Countries . . Technical Developments Adapted from Foreign Literature

Test Runs at Guatemala Kraft and Board Mill Show Good Quality

The early part of this year first-test runs were made at the new paper mill in Los Cerritos (near Escuintla), Guatemala. It is now known that the kraft paper produced at this mill shows good quality.

In full operation, the mill is designed to produce 40 tons of wrapping paper and paperboard daily. The base raw material is the waste left over after the extraction of essential oils from citronella and lemon grass.

The system as installed will be a continuous process, rendering the oils and converting the residue to paper in the same vats. As full production cannot be absorbed by Guatemalan demand, the manufacturers will seek export markets in neighboring Central American countries, according to report.

This project was started by a young Guatemalan, owner and operator of the largest essential-oil farm in Guatemala. The investment is reported to be well over one million dollars, financed entirely by the owner. (From *Foreign Commerce Weekly*)

▼

British Paper Notes

(March, 1949)

▶▶▶ STEP BY STEP the British paper trade is improving and gradually returning to the prewar level. Initially, at the beginning of the present license period (March to June), it was announced that production would be in the region of 80 per cent of 1938. But a few days ago a further list of increased productions for the present period was announced. Included among these was a 2½ per cent advance for the wood-free papers and several other qualities were similarly affected. Thus the general release of paper for day to day printing is being advanced.

The reason for this relief is not difficult to discover, for the amount of raw material now reaching this country is nearly up to 90 per cent of normal. While both mechanical and chemical wood pulp arrivals are far in excess of the early months of last year, esparto grass receipts have almost reached double the 1938 rate. Chemical wood pulp intake, compared to prewar, is now practically normal, but the decline in mechanical wood pulp receipts is serious, registering only 48,840 tons against a prewar total for two months of 110,070 tons.

While the total imports of paper and boards is actually higher than during January and February, 1948, it is noticed that this is due entirely to greater receipts of newsprint, which have moved up from 8,802 to 32,138 tons for the comparable periods of January-February, 1948 and 1949. Similarly, exports of paper and boards are higher by just over 10,000 tons on a present total of 30,219 tons, but here again newsprint is mainly responsible, for the comparable figures are 394 and 9,294 tons. It is interesting, incidentally, to notice that exports to the U. S. A. for the two months January and February of this year were 5,595 tons, whereas the total for the same period of last year was 291 tons.

A study of these Board of Trade returns discloses two very interesting features of present trading. The first is in respect to newsprint, for whereas home production is fixed at 50 per cent of prewar (which is understandable on the low importation of mechanical pulp), and home newspapers still are not permitted to print more than five pages a day (compared to their normal 16/32 pages), nearly 24,000 tons of extra newsprint have already been imported, and 9,000 tons more than last year have been exported, despite the presumed continued shortage. The other feature is that, if the newsprint totals are subtracted from both these imports and exports, there is actually a decline operating in our exports and imports of paper and boards. Unless the demand picks up for exports from the British paper trade, as well as imports to the British paper market, there would appear to be only one obvious answer to this stalemate—a general decline in prices.

Turning to another branch of the trade, the China clay industry, it was reported at the anuual meeting of English China Clays, Ltd., that 60 per cent of production was now being exported. The report deprecates the government's emphasis on exports, pointing out that in the past the trade had relied upon freedom in the home market, but that "under the present economic policy of the government, trade for home consumption is restricted, so that the cost position primarily rests upon the volume of export trade. This is the reverse of normal conditions, and is a situation which cannot be regarded as very satisfactory."

An illuminating over-all picture of the progress made by the British paper trade since VE Day is presented in the annual report of the Paper Makers' Association. As this report includes various figures for the years 1938 and 1945 to 1948 without comment, the fact is apt to be overlooked that the trade passed through the unfortunate effects of the coal shortage, combined with the severe winter of 1946-1947, and the prolonged drought both at home and in Scandinavia in the summer and autumn of the latter year.

However, despite these difficulties and misfortunes, the "Progress Report" is one for which the trade might be justly proud, and by present showing the gap between pre- and postwar production should be narrowed considerably this year. Between 1945 and 1948 imports of papermaking materials have moved up from 765,511 to 1,556,297 tons, the latter total representing 76 per cent of the prewar figure of 2,043,214 tons. During the same period production has reached 1,895,200 tons, approximately 595,000 tons higher than in 1945, and 72 per cent of the prewar reference year (September, 1938-August, 1939). While imports of paper and boards last year were under 50 per cent of prewar (actually 498,234 tons representing 46 per cent of 1938), exports moved up to 78 per cent of prewar.

It is noted in the report that as the improvement in the receipts of papermaking materials only began to operate seriously towards the end of 1948, the full impact of these receipts is not reflected in the 1948 returns. On the other hand, the greater receipts of esparto grass and the valuable effort of the intensified waste paper collection were at least two factors which helped considerably in the 1948 production figures. Employment in the paper trade is now only 3 per cent below 1938 with a total of 65,000.

The Association of Makers of Coated Papers have suffered a loss by the retirement of their president, L. C. S. Lewsey. Mr. Lewsey has held this position for the past sixteen years, and when he took up this position in 1933 the Association was relatively weak, not including by any means all the mills connected with the production of coated papers, and prices were in such a state that both the home mills and the importing mills were often selling at a figure below cost. During these sixteen years he has worked toward two ends: to bring in all the makers, and to keep prices on a remunerative basis. He has accomplished the first by making the Association 100 per cent representative of the trade, and a few years ago he formulated the Tripartite Convention, which included the makers, the merchants, and the Belgium mills. And quite recently this convention was extended to include the consumers. The convention covered white and tinted enamels, and more recently leatherettes. The consumers are now seeking to be included in the latter.

▼

Algeria Production Up—Facilities Expanded

A modern paper plant under construction at Baba-Ali, near Algiers, Algeria, will be in operation some time this summer according to plans. The estimated potential production of this plant will be from 10,000 to 15,000 tons annually. When capacity operations are reached, it will bring the total annual paper output for Algeria to near 25,000 tons.

A paper mill operating at Maison-Carree, a suburb of Algiers, recently installed machinery from the United States.

With the new installations, domestic

needs for wrapping paper may be met and small quantities may become available for export. However, the finer grades still will have to be imported. It is probable that France will continue to provide the bulk of these imports.

Better quality paper remained in short supply in 1948, whereas some of the lower grades, such as wrapping paper and printing paper (other than newsprint) were more readily obtainable. However, a shortage of paper for making cement sacks actually hampered cement production. Although there was a slight increase in newsprint production in 1948 over 1947, the output was below requirements. (From *Foreign Commerce Weekly*)

▼

▶▶▶ NEW PAPER MILL—A new enterprise, Tasmanian Board Mills Ltd., is to be established near Launceston in Tasmania. The company will manufacture wood pulp and paper. It was registered recently in Melbourne and is nominally capitalized at £1,500,000.

Foreign Abstracts . . . . . .

The "Countercurrent" Kollergang

The author has made a study of the effectiveness of an edgerunner described in German Patent No. 733,206. The köllergang is so fabricated that the bedstone can either be kept stationary (Figure 1) or in motion (Figure 2), thus permiting a comparative study of the relative efficiency when the bedstone is in motion or at rest. The roll stones move clockwise and the bedstone (when moving) travels counterclockwise. Pulp samples were taken at definite time intervals, formed into sheets and tested methodically for burst, breaking length, elongation and folding endurance. In no case was there evidence of hydration and the experiments showed clearly that while the edgerunner disintegrated the pulp, it failed to beat the stock. Mucilage was not formed, and, provided the kollerganging was restricted to one half hour, fibers remained virtually uninjured.

The revolving bedstone showed marked advantages over the stationary stone. It caused far more rapid disintegration of sulphite or sulphate pulp and of "broke" than did the resting bedstone. When soda pulp was treated in the köllergang without previous beating, all the initial strength properties of the stock dropped, even in a relatively short time. However, when the pulp was beaten one and two hours prior to the köllergang treatment, most of the strength properties were maintained. In this maintenance of (hydrated) pulp quality, the more efficient countercurrent köllergang also showed advantages, although the power consumption was somewhat higher than when the bedstone was stationary. This increase in power consumption rose rapidly when the pulp charge increased above a certain point (300 kilograms, in the case of the edgerunner described herein). On the other hand, the bedstone was stationary. This increase cess far more broke within a given time than could the köllergang with stationary bedstone. (5000 kilos versus 8000 kilos in 24 hours). The article is well illustrated, 12 diagrams. Karl Wintgen. *Das Papier* 2, No. 21/22, 405-10 (Nov., 1948) (In German).

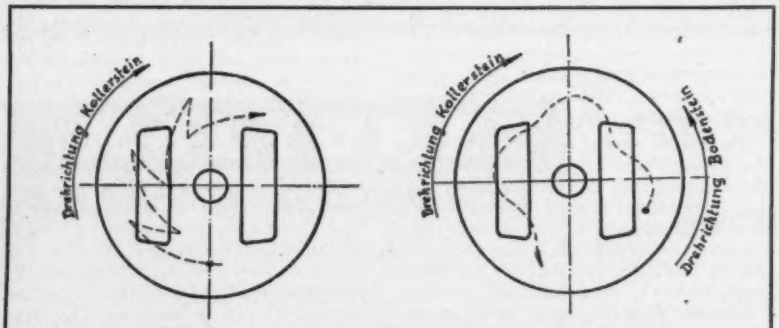

Figure 1—left—(Counter-current kollergang). Indicates diagrammatically movement of the stock, with resting bedstone and clockwise motion of rollstones . . . Figure 2—right—(Counter-current kollergang). Indicates movement of stock, with bedstone moving counterclockwise and rollstones moving clockwise

The Significance of Laboratory Paper Tests

The author, whose work was carried out in the Laboratoire de la Régie Industrielle de la Cellulose Colonial examined eight different wrapping papers prepared in regular mill runs and compared them in each case with (I) papers made from identical stocks beaten *in the mill* to the same degree Schopper-Riegler, but converted into test sheets on a British sheet mold *in the laboratory* and with (II) papers made from these same stocks beaten *in the laboratory* and then made into sheets.

The pulps varied widely (from a straw cook to kraft pulps made from tropical hardwoods and with freenesses ranging from 17 to 63 degrees Schopper-Riegler). In nearly every case there was an excellent correlation between breaking lengths of a paper prepared entirely in the mill and that obtained by techniques (I) and (II). With one exception these were within 10%. Bursting strengths of the paper samples made by the three methods were also respectively similar, although here the correlation was not as good. For example a paper made in the mill might show a difference in burst of 40-45% from one prepared exclusively in the laboratory (by method II).

No satisfactory relationship was noted in either tear tests or in porosity measurements. In fact in the case of the latter no corre-

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lation whatsoever could be uncovered between I, II and the corresponding commercial sheet. In processing the pulp, the Lampén mill proved highly unsatisfactory and at times failed to hydrate the pulp. The Lamort laboratory beater was generally used and was found quite satisfactory. The author's results were discussed critically by a group of technologists, and the entire discussion is reproduced *verbatim*.

It was brought out that the author had omitted comparative sizing measurements because of the lack of sufficiently sensitive equipment. Beaters used in the mill runs were usually of the Allimand (and sometimes of the Bertram) type. Techniques used in beating in the mill runs were reviewed, with special reference to time of beating to reach a certain degree Schopper-Riegler. The author concluded that the laboratory beater operated about six times as rapidly (to reach the desired degree of hydration) as did the mill beaters. However some of the critics felt that not only should time of beating but power consumption in the mill be taken into consideration. R. Peteri *Bull. assoc. tech. ind. papetiere* 3, 2-12 (1949) (In French).

Choice of Plastics for Export Packaging

When plastics in packaging are to be used in tropical climates with high relative humidities, fungal attack becomes a hazard. The following plastics, from experience are not affected by fungi—cellulose acetobutyrate, ethyl cellulose, polythene, polystyrene, polyvinylbutyral, polyvinyl chloride, and urea formaldehyde resins.

The following may be very mildly affected by fungi: cellulose acetate and phenol formaldehyde resins. The following will support a moderate fungal growth: cellulose nitrate polyvinyl acetate and melamine-formaldehyde plastics.

Whereas it appears that most of these resins do not support growth and no great trouble is encountered in their use, a number of *plasticizers* are quite susceptible. Among them "Paraplex RG20," butyl acetyl ricinoleate, and butoxyethyl stearate support heavy fungal growth, whereas others like benzyl benzoate, glyceryl triacetate and dibutyl sebacate may support moderate growth. Tricresyl phosphate and dibutyl phthalate are quite safe. When organic fillers are used, these may be quite susceptible to attack. These include, wood flours, ground walnut shells, papers or fabrics.

Whereas it is a *general rule* that when thermosetting or thermoplastic compositions are made, these will be fungistatic provided all ingredients are resistant to fungi; this is not an infallible principle. For example, combinations of dioctylphthalate and vinyl resins are more susceptible to fungal attack than either of the two alone. This may account for conflicting reports in the literature.

Fungal attack, it is believed does not cause permanent deterioration of the plastic —but with cellulosic fillers this is not necessarily the case. To overcome these difficulties fungicides may be introduced directly into the plastics, and this is best done before molding the powders or calendering the thermoplastics into sheets. One of the best fungicides is salicylanilide. Others are copper naphthenate and phenyl mercuric salicylate. An important consideration is the compatibility of the plasticizer with the fungicide (which usually requires about 2% based on the weight of plastic). Some of these compatibilities are discussed. William S. Penn *The British Packer*, 11, No. 1, 24 and 36 (1949).

Mill Water; Its Effect on Pitch Troubles

This work was actually carried out in *Hallsta Pappersbruk*, Hallstavik, Sweden, but was published in Canada, and it was the mill water used in this specific plant which was studied (and compared with waters used in two other mills). The effects of hardness of water, used in the paper mills, on pitch troubles have been investigated in the past, without however, giving very definite answers to the problem. In the present instance, the author has resorted to the following procedure: 150 grams of the various sulphite pulps under investigation were disintegrated for one hour at 40 C in the disintegrator of the British pulp testing machine in the presence of three liters of water.

The pitch, adhering to the walls of the container, was dissolved in dichloromethane and weighed after evaporation of the solvent. It was found quite regularly for a number of pulps that mill water deposited far more pitch from a given pulp than did

distilled water. Attempts to remove calcium from the mill water by permutite treatment caused no improvement in pitch deposits and mill water simply flocculated with alum at *p*H 6.3 and then sand filtered, actually deposited slightly more pitch than did the original mill water. Sea water also caused marked pitch deposition, and artesian well water (even though very "hard") caused less difficulty than did the original mill water.

These preliminary experiments led to the following conclusions—neither alum, softening alone, nor sand filtration obviated the pitch troubles which were evidently not due in the main to calcium, sodium or chloride ions. When calcium carbonate (or to a lesser extent calcium hydroxide) was added to the distilled water the pitch increased significantly. On the other hand, when the mill water was acidified and aerated, the pitch deposition in the laboratory experiments fell in one case from 90 milligrams to 11 milligrams (the latter being identical with the deposit obtained by using distilled water alone). Continuing on the assumption that the bicarbonate ion was in large measure responsible for pitch deposition, the author treated the distilled water both with sodium bicarbonate and hydrochloric acid and another sample with calcium carbonate and hydrochloric acid (both to *p*H 7).

In either case, large pitch deposits were obtained. The effects of carbon dioxide (or bicarbonate) were relatively small, however, when the acidity was high, and when the water was relatively free from metallic ions. Carbon dioxide, however, is not removed simply by acidification. In fact neutralization after acidification (*without* previous aeration) has only a partial effect. This is shown in the following table:

Source and treatment of water	*p*H	Pitch deposit in milligrams
I Mill water untreated	7.0	195
II Mill water acidified to *p*H 4, and after three hours neutralized without aeration	7.0	152
III Mill water treated as in II, but aerated prior to neutralization	7.0	56

The water could also be "decarbonized" by precipitation with a mixture of calcium hydroxide and calcium chloride. In one case this treatment lowers pitch deposits of a pulp from 168 mg to 30 mg. Mill water, which was put through a hydrogen ion exchanger contained only acids plus carbon dioxide. When this water was then aerated, and neutralized, or if this water was mixed with mill water, softened in a sodium ion exchanger, *followed* by aeration, the pitch deposits dropped markedly. In fact the pitch deposits were then but slightly above those formed when distilled water was used in the experiments.

The author also showed that waters from other mills (e.g. the Norrköping mill) which contained less bicarbonate per liter and which also showed a lower total hardness than did waters of the Hallstavik mill gave rise to far less pitch deposition for a given pulp. Some few experiments were also carried out with groundwood pitch, where the deposits were relatively small. However as the following table shows, the effects were fundamentally similar; *i.e.* the pitch troubles increased with increased carbon dioxide concentration.

Groundwood pulp disintegrated in	*p*H	Pitch (milligrams)
Original mill water	7.0	29
Distilled water	7.0	14
Distilled water plus 300 mg./1. sodium bicarbonate	7.0	25

Whereas aeration is strongly indicated the author warns that as little oxygen should be left in the water as possible, because this seems to augment corrosion. Hydrogen ion exchangers would mean higher installation costs, but these might be justified. Carbon dioxide may also be removed by lime, but this would require a large plant with basins and filters and an excess acid for neutralization which probably places this procedure beyond the economic range. Gunnar Gavelin. *Tech Section Canadian Pulp and Paper Association, Pulp and Paper Mag. Canada* 50, No. 2, 59-64 (1949).

The Alpha-, Beta-, and Gamma-Cellulose Determinations

Staudinger has shown that a native cellulose having a degree of polymerization of 1000 may be insoluble in cold 10% caustic soda, whereas a regenerated cellulose having this same degree of polymerization may actually be soluble in a caustic solution of similar strength. The present author speaks of the current neglect of the surface of fibers exposed to alkali when the alpha cellulose determination is made. He shows that the usual German technique for alpha-cellulose is open to serious criticism, because, on diluting with water prior to filtration of the mercerized cellulose, changes occur in the fiber surface. Mechanical shredding of any cellulosic material must be avoided.

The following procedure is advocated: the pulp is defibered so as not to injure the structure, and is then converted into a sheet, which is air dried and disintegrated manually. Samples of 2.5 grams are taken for analysis and are treated at 20 deg. with 30 cc 17.5% caustic soda *with the minimum handling*. The pulp suspension is then filtered on a Jena 11G3 crucible and is washed successively with 50-100 cc 10% sodium sulphate solution, water, 50-100 cc normal sulphuric acid, and finally with water until acid free.

The results by the author's method are invariably higher than those found by the usual German procedure, and these differences range from about 2 to 4%. The total alkali soluble carbohydrates (*i.e.* the beta- plus gamma-cellulose) cannot be determined accurately by using an aliquot of the *initial* (17.5% akaline) filtrate. If this is done, the results are somewhat high (*ca.* 1-2%). Instead, it is advisable to use an aliquot portion of the entire filtrate (*i.e.* filtrate plus washings). If in such cases, the carbohydrates are determined by wet chromic acid combustion, substantially correct values are obtained. The "wet combustion" is carried out with 50 cc of a suitably diluted solution of the beta- and gamma-cellulose, to which 10 ml normal bichromate solution and 35 ml concentrated solution are added. (Blank combustions with pure dextrose show a recovery of 96.6%.)

The author gives data for a series of bleached spruce and beech pulps (15 in all) and the summation of alpha- plus beta- plus gamma-cellulose ranged from 99.7 to 100.7%. Helmut Doering *Das Papier* 2, 359-64 (1948); 3, 37-9 (1949) (in German).

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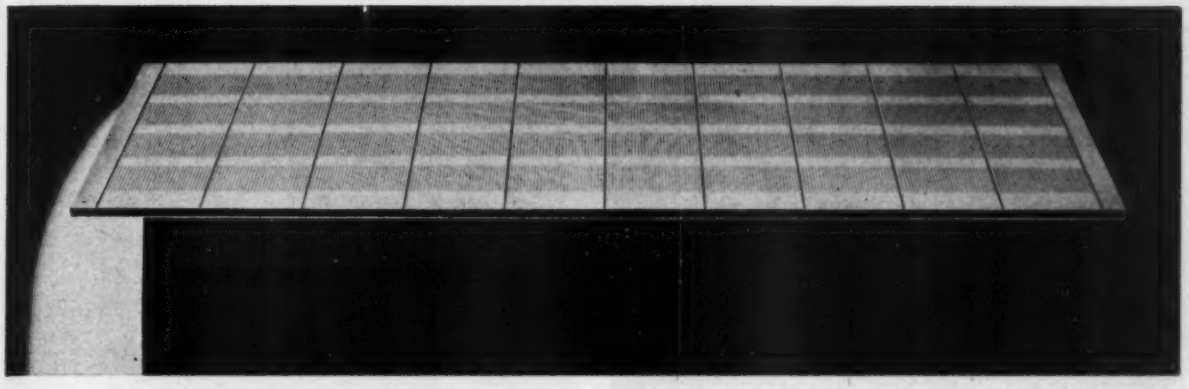

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Convention Papers . . . Abridged

Paper Machine Developments*

E. A. HODGE[1], P. ANDREW JACKSON[2] and P. H. GOLDSMITH[3]

The building of paper machines should be synonymous with their improvement. They have grown too large and too expensive to make it wise economy to install an obsolete machine. Each new machine should therefore be superior to any older one in its field if a large investment is to be protected. Each important new machine should therefore include the latest improvements. On the other hand, the size of the paper machine also makes it imperative that all new improvements be engineered and applied with great care so that no risk will be introduced. At no point must a new installation be made dependent upon any feature which is not fully tried and proven. It may be of interest to describe in a few words the methods by which papermakers and paper machine builders together evolve successful improvements in the paper machine.

The first step in devising a useful improvement is usually to observe the paper machine in actual operation in order to discover the obstacle to quality, production or ease of operation. Experienced papermakers have probably long been familiar with these limitations and the paper machine designer must be able to view them through the eyes of the papermaker.

The next effort is usually to prove the cause of the difficulty. This is often most easily done by following the well known papermaker's axiom, "If you can make it worse, you can sometimes make it better." In such cases, one tries to prove that one can create the difficulty which one is trying to remove.

Some of the facts on which a new design is to be based can sometimes be established, or at least strongly indicated, by laboratory or model tests. The final proof must, however, come from paper machines in actual operation. Before starting to build the new device, it should be reduced to its simplest possible form. Nothing is really good until it is as simple as possible. It is a greater accomplishment to be able to remove something from a machine than to add something to it.

The first units of any new design of equipment should naturally be very carefully watched after they go into operation. The results must be judged through the papermaker's eyes, which are experienced in detecting small quality differences in the sheet of paper.

No idea is productive if it is not used. A major share of the credit for engineering improvements must therefore go to the operators who first recognize the possibilities of a new design and specify it for their equipment. In fact, the need for such improvement will usually have been pointed out beforehand by able papermakers.

Suggestions for improvement are made by the operating personnel and after a number of different installations, the design becomes standardized thereby tending to reduce the cost. One of the main functions of the machine builder is to analyze and correlate apparently contradictory reports which are very often not contradictory when the full facts are known.

Development of the Flow-Spreader

We might take the Flow-Spreader as a typical case history of a paper machine development. The Flow-Spreader has been described in considerable detail before. It will therefore be sufficient to say that its purpose is to deliver a smooth and even flow across the full forming width of the paper machine, either fourdrinier or cylinder. It depends upon the principle of a hydraulic nozzle with a gradual angle of spread and a progressively reducing area.

The short, shapeless inlet hoppers which used to be customary on cylinder vats produced turbulences which resulted in wild formation on the cylinder mold. This often limited the amount of water which could be used. These troubles resulted in the development of the Flow-Spreader.

It was first found that by going to longer

(*) Given before the Michigan Division of The American Pulp and Paper Mill Superintendents Association, Inc., at Kalamazoo on December 16, 1948.

(1) Vice President, (2) Sales Engineer and (3) Sales and Development Engineer of The Pusey and Jones Corporation, Wilmington, Delaware.

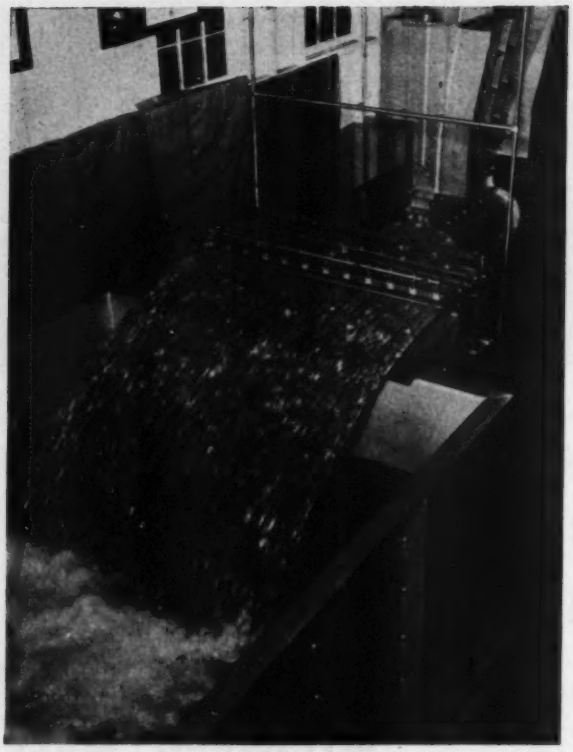


Figure 1

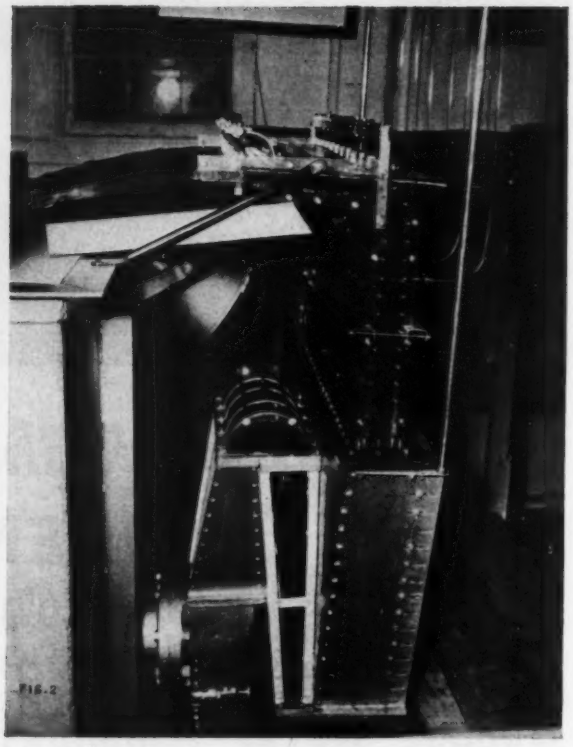


Figure 2

hoppers with a more gradual angle of spread, the flow across the machine could be made progressively more uniform and smooth. It was then found in actual mill trials that the best results could be obtained with a given spreading angle as the area was progressively reduced. The lengthening of the hoppers lead to the multiple pass Flow-Spreader.

The amount of area reduction was found to be a very important factor. It has however proven desirable not to make the discharge throat too narrow. The last pass of a Flow-Spreader on a large paper machine (in operation) was therefore rebuilt to produce an enlarging bottom turn around between the last upward pass and the preceding downward pass. Careful observation of the results in the mill showed that this enlargement of area at the "turn around" permitted a greater subsequent "squeezing action." At the same time a lower velocity was obtained at the throat.

A transparent model was then built to one-fifth scale. The deliberate admission of air permitted a study of the flows, Figure 1 & 2. The results observed on actual machines were correlated and more fully explained by these model tests.

All of the various steps indicated above resulted in distinct improvements so that each successive user obtained constantly better results. After the model tests, it was possible to standardize the design of the Flow-Spreaders which are now built in five sizes with inlet diameters from 16″ to 38″, suitable for machine widths from 49″ up to 240″. Several dozen Flow-Spreaders of all sizes are now in operation on both fourdrinier and cylinder machines on a very wide variety of grades ranging from tissue paper to boards and felts.

Fourdrinier Developments

Among the fourdrinier improvements gaining ground today is the closed, or pressure, slice. With the continual increase in machine speeds, the height of the open slice has become greater and greater. On the other hand, we feel that one of the main difficulties in connection with the pressure slice has been overcome by the development of the Flow-Spreader.

The Rapi-drape fourdrinier has become our standard. As is well known this type of fourdrinier permits the draping of the fourdrinier wire in the aisle. The wire on its carriage is then run in over the fourdrinier part. This contrasts with the older method in which the whole fourdrinier was disconnected, rolled out, and then rolled back inside the wire. As in the case of other major developments, many minor improvements have been introduced into the Rapidrape fourdrinier in the process of standardizing it.

There is a decided trend towards welded fabrication of parts and the use of non-corrosive metals in connection with our present fourdrinier part designs. The arrangement for the removing of the suction boxes has been greatly simplified. The auto and hand guide arrangements have been combined on the same roll making the wire guide adjustments more convenient for the machine tender. One of our recent large Southern machines is the first one in this country to have a couch equipped with two suction boxes. The modern tendency is to replace infrequently used motors on the fourdrinier part with hydraulic systems. This applies to the wire carriage, breast roll and fourdrinier raising movements.

Cylinder Vat Developments

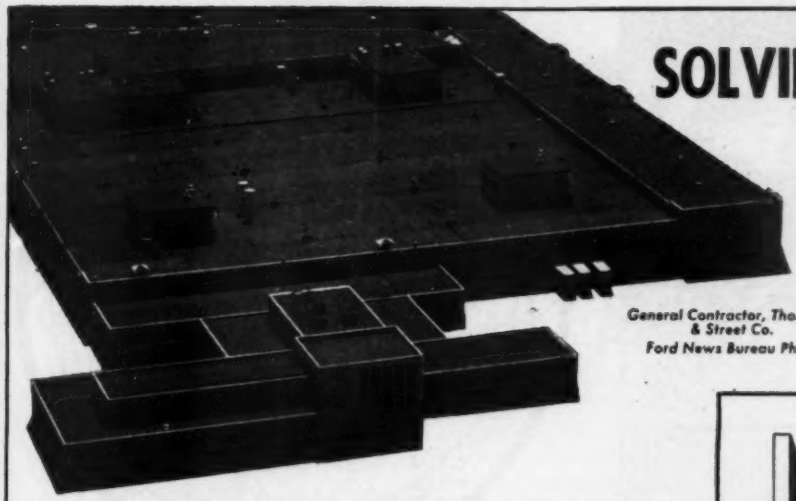
Stream-Flow Vat Systems today permit much better formation and higher forming speeds than were possible with the older types of cylinder vats and molds. While the results are due to the elimination of each of a number of bottle necks, every part of the Stream-Flow Vat Systems went through a process of development very similar to that of the Flow-Spreader. The latter was in fact originally developed as part of the Stream-Flow Vat System and was later applied to fourdrinier machines as well.

The method of mixing within the pipes and of using the Up-Flow Head Box only for air escape, and as a steadying free surface, was proven out and simplified step by step before the Up-Flow Head Boxes were standardized.

In a similar manner the Stream-Flow Vat, with its outer approach pass and adjustable inner vat circle, went through a number of successive improvements before its design was stabilized. As an example, it might be mentioned that in the first Stream-Flow Vats, the front and back circle settings could be read directly on the dial but to know the bottom circle clearances required reference to a tabulation. One of the steps of simplifying the Stream-Flow Vat was to make all three circle settings read directly on the dials.

Stream-Flow Cylinder Mold

This rather far-reaching development might afford another case study of development methods. The limitations of the old conventional cylinder mold with its central



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shaft and spiders were in part well known and in part strongly suspected. It was known, for instance, that, due to the old spoke construction, only a very limited amount of vacuum could be used because the mold could not be sealed against air between the couching point and the point of submergence. It was also common experience that even this moderate amount of vacuum would tend to make the sheet wrap because the air rushed in at just the point where the sheet was being couched off. On the other hand, the disturbance to formation caused by the spokes could not be fully proven until the spoke disturbance could be removed by a spokeless construction. It was possible to "make it worse" by increased speeds and by lowering the level inside the mold, etc., but actual proof had to await mill installation under paper-making conditions.

This was the type of problem in which it paid to make model tests. While the facts that could be established by the model were limited, the commercial construction would be expensive and some of the preliminary questions could be answered by rather simple hydraulic tests. The analysis of the limitations of the conventional cylinder molds had shown that a mold should be developed without spokes. For free drainage, its face would have to be as open as that of the conventional cylinder mold. The conception therefore contemplated a mold with comparatively deep parallel vanes which would be pitched forwardly to avoid outward washing. The model (Figure 3) was made with full 48" dia. x 24" face and was tested in our shops up to speeds of 1000 fpm in water only without stock. This model showed that the basic idea was sound.

An experimental vacuum Stream-Flow Cylinder Mold constructed along these lines was next installed on a three-cylinder-machine making high-grade cylinder papers. This installation proved by comparison with the other two molds, which were of conventional type on the same stock, the existence and the elimination of the "spoke disturbance." It also proved the greater load carrying capacity provided by the vacuum as well as that the vacuum, as applied, gave a wide useful range without cylinder wrapping or other harmful effects. In addition, it indicated that the vacuum could be applied in one chamber comprising the whole forming length and continuing up to the couching point without losing any benefits. The tests on this mold continued over several months on a wide variety of grades from very light to very heavy webs and showed the benefits that could be derived from this new type of cylinder mold. This particular mold, due to its compartmentation, etc., required a rather complicated piping hook-up for test purposes and was therefore removed after it had yielded the desired test data.

The next Stream-Flow Cylinder Mold to go into service was constructed toward the end of the War and had to be built of mild steel since non-corrosive metals were not obtainable. It was made for operation in connection with a single cylinder felt machine in California. We fully recognized that this mold could have only a temporary life. We were however tempted to apply a nickel plating to the outside of the mild steel in the belief "it could not hurt and might prolong the life." This proved to be a mistake since the nickel plating later peeled off and closed the space between vanes thereby producing streaks in the sheet. This is an example of the temptation often facing the development engineer to inject a factor which has no real bearing on his problem. We also wound this mold with "high winding wire" which later presented difficulties in tightening. These two errors illustrate what may be considered the cardinal sin in development work, i.e., injecting problems into the project which have no bearing on the objectives of the design. This temporary mold produced excellent results after the nickel plating had been removed but the corrosion of the mild steel loosened the winding wire and this mold was scrapped. In the meantime, a new mold of stainless steel construction had been ordered and its operation has been very satisfactory.

The design has now been standardized and a number of these cylinders are under construction and on order. This case history is intended to illustrate not only the types of mistakes which can occur in a major new development but also that the fundamental soundness of such a development must not be lost sight of because of incidental troubles which have no bearing on the main issue.

Press Part Developments

Our modern "Simplex Press" eliminates the old side housings and swing arms for the upper rolls and also all levers and weights. Upper steel rails of heavy rigid

Figure 3

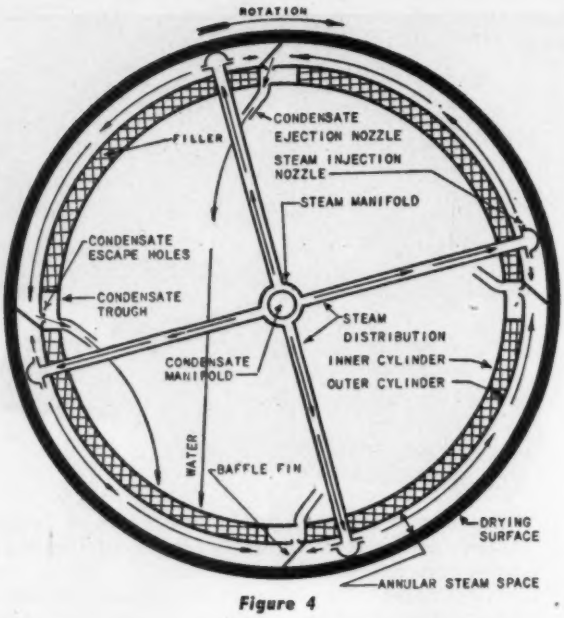


Figure 4

welded box-type construction have knees suspended from them. The slide bearings of the upper rolls engage these knees. Loading and lifting are accomplished by air cylinders carried on the upper rails. Primary presses and couch rolls on cylinder machines are arranged for counterweighting as well as for loading and lifting. Convenient air switches and gauges permit easy and accurate control.

This type of press section is much more accessible for operation and maintenance. Hand and automatic felt guides are now combined for the operator's convenience.

On modern machines, the felt stretchers are generally installed vertically in the basement where the machine tender cannot observe the position of the stretch roll. A new departure is the use of the "squaring roll." An extra hitch of the felt is led over a calibrated hand guide on the operating floor under the eye of the operator. The stretch roll is kept square at all times. This permits squaring the seam of the felt without having to check the stretch roll for its out-of-square position.

Semtile tanks have no limitations as to shape or size, provided a vertical type unit is used.

They can be erected in almost any location and in extremely confined space where it would not be possible to fabricate other types.

They withstand heavy bearing loads, as this results in a compression on the wall which aids in resisting temperature and shrinking stresses.

Other Semtile features to remember—

No through joints in a Semtile tank, either horizontally or vertically.

Semtile salt-glazed tile presents a smooth flowing, easy to clean surface.

Stebbins Engineering and Manufacturing Company

EASTERN BOULEVARD, WATERTOWN, NEW YORK

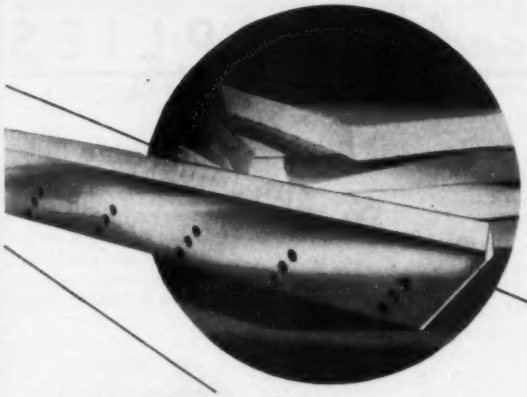
Dryer Part Developments

A modern dryer section is a far cry from the old dryer sections with plain bearings and open gears in which the dryers were sometimes not even bored. In the case of new machines, even those for slow speed operation, the industry today is demanding modern mechanical design for the dryer section. Antifriction bearings have became standard. Recent machines have dryer bearings equipped with lucite windows. The dryer gear train is completely enclosed. By means of intermediate gears, the dryer gears are kept small and the driving side of the dryer section is nearly as accessible as the tending side. While this type of dryer drive has been standard with us for some time, it is now becoming practically universal throughout the industry for new, modern machines. In the case of high speed machines, the trend is towards helical teeth for the enclosed gearing.

Much attention has been given the steam joints which are now greatly improved. They are mounted on brackets solidly bolted to the back gear covers. One benefit is a very large reduction in power compared with the older joints. These new steam joints can also be removed and replaced while the machine is running. For condensate evacuation, Dual Revolving Syphons, which rotate with the dryer shell, are preferred. When drop syphons are preferred, they are made adjustable as to position, with the machine running.

Vitalized Dryer

A new type of dryer design may serve as



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a case history of major development in its earlier stages:

With increasing speeds and tonnages, dryer sections have necessarily become larger in size and the dryers more numerous. This has fostered keener interest in possible ways and means of obtaining higher drying capacities without further adding to the number of dryers.

The Pusey and Jones Corporation designed and built ships for many years, having shipyard facilities adjoining its machine shops and foundries. Thus, its files contain valuable test data on modern steam engineering. It was quite natural, therefore, that our marine engineers should be invited to examine the paper machine dryer as a heat exchanger. Their intimate experience with steam problems and performance guarantees, as well as a fresh viewpoint, have resulted in a very interesting improvement in the application of steam to paper drying. Their objective was two-fold; that is, to improve *existing* dryers equally as much as *new* dryers, whether the shells be of cast iron, steel or any other metal. The means to this end is a rigid cylindrical structure which is made of light weight, non-corrosive metal, and which can be inserted in any dryer having bolted-on heads. The structure has been termed a "vitalizer" and is illustrated in Figure 4.

The inner cylindrical structure provides an annular space between itself and the dryer shell. This annular space is divided into some four to six segments by baffle fins extending the length of the dryer. Steam is admitted to the annular space at several points along the fins and travels across the inside surface of the dryer shell at as high as 100 times the velocity of steam now introduced into an ordinary dryer. High velocity prevents the formation of gas and air films on the inside of the dryer shell.

The condensate produced by the transfer is guided from the shell by the baffle fins and is quickly ejected through orifices leading to the *inside* of the inner cylinder where it *cannot* contact the dryer shell and retard drying. The inner cylinder is provided with a groove around its whole circumference in which the condensate collects for removal by the usual dual or drop syphon.

Balanced pressures preclude the need for steam tightness in the Vitalizer.

The development procedure, in this case, was to conduct a series of shop tests on two identical dryers 48 inches by 100 inches. One of them had the Vitalizer inserted in it, the other did not. A wetted dryer felt was run over each dryer under similar test conditions. The steam introduced and the condensate removed were carefully measured as well as horsepower and temperatures at a variety of points. These tests showed that under the same conditions the Vitalized dryer condensed a good deal more steam and could therefore be expected to dry more paper. The horsepower reduction was about 19%. The gain in drying capacity of the Vitalized dryer over the ordinary dryer in the long series of tests ranged from 20% to over 30% depending somewhat on speed; the runs being conducted up to 1920 F.P.M.

Following the conclusion of exhaustive shop testing, the next step has been to apply the Vitalized dryer to commercial use. The first happened to be for milk drying but others have since been sold for both newsprint and boxboard. Judged by the outcome of tests made to date, the commercial application of the Vitalized dryer should offer a marked increase in capacity over ordinary dryers with the result that fewer dryers should be required for a given tonnage. It is also believed that steam requirements may be decreased as well as drive power.

Other Improvements

The calender stacks today are usually equipped with anti-friction bearings on all rolls. The lubricating system is separate from that of the dryers. Pneumatic loading is now being applied to the calenders in a manner similar to the pneumatic loading used for the presses.

Pope type reels are being applied to cylinder machines instead of the older upright reels. This is because Stream-Flow Vat Systems are permitting much higher forming speeds than were previously practical.

Winder roll ejector and dumping arrangements are now hydraulic instead of electrically operated, providing smooth functioning.

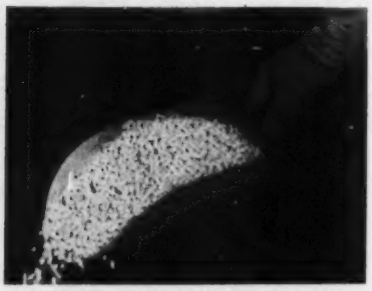
The sectional electric drive is gaining in preference over mechanical drives for new machines, even for relatively slow speed machines. While this trend has been noticeable on high speed fourdrinier machines for some

(Turn to page 266)

New EQUIPMENT *and* SUPPLIES

Dowicide G now Comes in Pellet Form

Water-soluble sodium pentachlorophenate, germicide and fungicide, is now available in the form of hard pellets from the Dow Chemical Company, Midland, Michigan. This purely physical change-over from flake to pellet was developed to control the dust

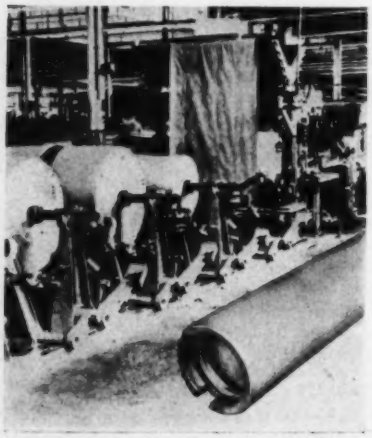


and facilitate handling the salt during its application to industrial products. Dowicide G, sodium pentachlorophenate, had been used in the pulp and paper industry for effective control of microorganisms in recent years.

The pellets are compressed to one-fourth the volume of the original flake. The new pellets are packed in fiber drums and are marked pellets to distinguish them from the flake.

Paper Core Made of Special Aluminum

A new aluminum paper core stock has been developed by the Industrial Machinery Division of Reynolds Metals Company, Louisville, Kentucky, for the paper and



printing industries. Paper cores made from this material facilitate the handling of large quantities of paper with a smaller amount of effort and at lower cost.

This rigid aluminum core stock is made from a tough heat-treated alloy especially for the job of handling paper. The empty cores are so light that one man can handle several easily, yet they are strong enough to prevent crushing or collapsing when supporting heavy rolls of paper. The ends of the cores are reinforced with steel so that the core takes hard wear from the driving members but at the same time feeds paper evenly. Core stock may be obtained by the user and made up into cores, or finished cores can be obtained direct from fabricators.

Being made of aluminum, these cores provide a special advantage in that they cannot rust. This means that it is impossible for the cores to stain paper. Thus all the paper can be used right down to the very end of the roll. Too, the cores remain clean much longer than other types. Strong, lightweight aluminum offers shipping economies also and can take rough handling in shipment without damage.

A General Purpose Photoelectric Control

A photoelectric control designed for general industrial and machinery application and adaptable where space is limited has been announced by Photoswitch Incorporated, 77 Broadway, Cambridge 42, Massa-

chusetts. It provides precise, automatic control for many specialized industrial processes including the paper industries, and is particularly efficient in counting, conveyor control, short-range signal systems, production inspection, motor or valve control, machinery safeguards, and stop-motion control.

Rugged in design, built to withstand vibration, and simple to install, photoswitch control *Type 20DJ1* is designed to provide completely reliable and continuous operation with unlimited life under conditions of extremely high temperature and humidity.

Dynathern Resistance Thermometer Bulb

Suitable for any installation with operating temperatures below 600 Fahr., the new Dynatherm resistance thermometer bulb manufactured by The Foxboro Company of Foxboro, Massachusetts can be used to replace most thermocouple or filled-system bulbs. It can be installed in a well of ¼ inch in diameter or more, and of any depth.

This adaptability results from the fact that heat transfer to the sensitive portion of the bulb is through its tip, instead of through the sidewalls as is customary. The bulb is therefore brought into actual contact with the well, which contributes to precise and rapid temperature measurements.

Bubbler Meter

Gas or liquid purge rates are measured in familiar flow units by a new purge service flowmeter, designed by the Fischer & Porter Co., Hatboro, Pa.

The bubbler type purge meter is an adaptation of the Flowrator instrument that includes a built-in needle valve for close control of purge rates. It covers the range

of measurement generally accepted as standard for bubbler installations. The unit consists simply of a Pyrex or stainless steel ball-shaped float, a precision-bore Pyrex metering tube and a die-cast body which houses the needle-type control valve.

Tester to Determine Wear and Scuff Resistance

A new abrasion testing set has been designed by the Taber Instrument Corp., (Dept. PE) North Tonawanda, N.Y., which is used for testing the wear and scuff resistance of paper under various temperature and humidity conditions. The wear results from alternately rubbing the flat faces of

two resilient wheels over the surface being tested. A range of standardized abrasive wheels are available for testing all types of surface finishes.

New features include improved suction pump with vertical dust receiver with swinging nozzle fully adjustable for any thick-

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300	Westghse.	CW	2300	367
300	Al. Chlrs.	ANY	2300	720
300	Westghse.	CW	440	900
250	Gen. Elec.	IM	2300	450
250	Cr. Whlr.		440	600
250	Ideal.		440	720
125	Gen. Elec.	IM	2300	720
100	Westghse.	CW	440	575
100	Al. Chlrs.	ANY	440	720
100	Gen. Elec.	IM	440	900
75	Gen. Elec.	IM	440	514
75	Cr. Whlr.	25Q	440	585
50	L. Allis	GH	440	870
35	F. Morse		440	1800
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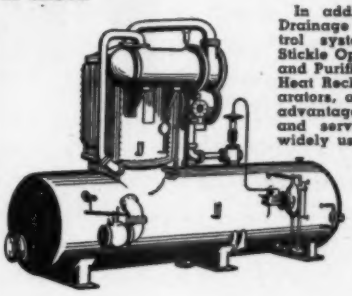
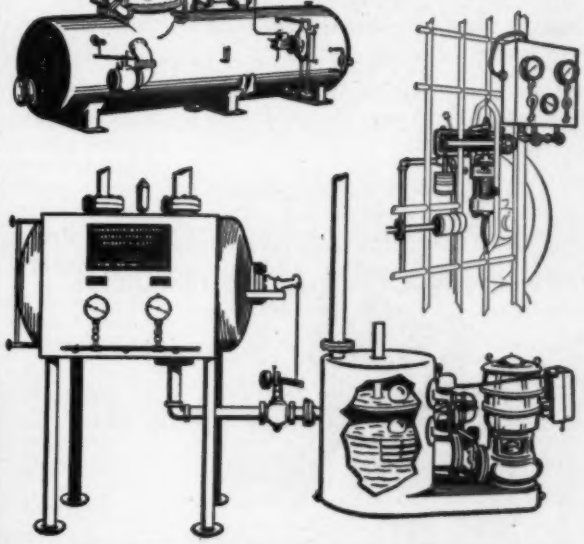


In addition to Stickle Differential Drainage and Automatic Steam Control systems for paper machines, Stickle Open Coil Feed Water Heaters and Purifiers, Machine Room Heaters, Heat Reclaimers, Oil and Steam Separators, and other units offer special advantages in design, construction, and service hat have made them widely used.



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A Stickle System is composed of tried and tested units selected, adapted, and integrated to create the most favorable conditions for efficient and economical production. Stickle systems are designed to meet specific conditions of operation. Bulletin No. 160 and 160-A will give you more complete information. Discussion of your problems with a Stickle engineer entails no obligation.

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● Supplies Rapid Circulation of Steam through Dryers ● Provides Rapid Removal of Condensate and Gases ● Increases Production ● Eliminates Steam Waste ● Reduces Drying Pressure to Minimum ● Improves Quality of Product ● Gives Visible Operation of Dryers ● Provides Sensitive Automatic Control ● Assures Accurate Modulated Temperature ● Holds Moisture to Predetermined Content.

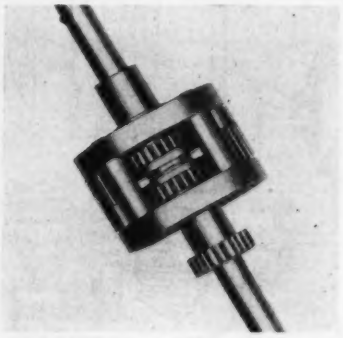
ness specimen. The control panel is also equipped with an adjustable timer to provide a test period of 1000 cycles, or less, and then automatically shutting off the power permitting the operating technician to be otherwise engaged in tabulating results or preparing new specimens without concern of overrunning the test being made.

Switches on the front of the control panel provide any combination of operating conditions, such as with or without vacuum pickup, continuous operation without timer or any timing up to 15 minutes. The set, when furnished with the vacuum pickup is adapted to a wider range of testing and greater precision when testing dry materials due to the suction features which removes abradings.

Mechanical Differential

Small, precision made, mechanical differentials which are frequently helpful to the designing engineer in the solution of measurement and control problems have been developed by the Milwaukee Lock & Manufacturing Co., 5080 N. 37th Street, Milwaukee 9, Wis.

These differentials present such possibilities as measuring and controlling relative speeds, speed sums and speed differences, angular sums and angular differences,



accurately controlling speeds and positions, measuring and controlling torques, greatly multiplying speed ranges, obtaining great speed ratios between shafts, indicating and controlling torque and speed direction, indicating and controlling rates of acceleration and deceleration, automatically controlling sequence operations, quickly and reliably reversing and changing speeds without disconnecting power sources, shifting phase angles between rotating shafts, providing reliable clutches for connecting and disconnecting power or providing power transfers, together with many other applications and variations which are being explored and developed day-by-day.

The "Milwaukee" differential is now available in either the conventional open style (as illustrated), or in a newly perfected jacketed style which is grease lubricated.

Lightweight Dust Hood

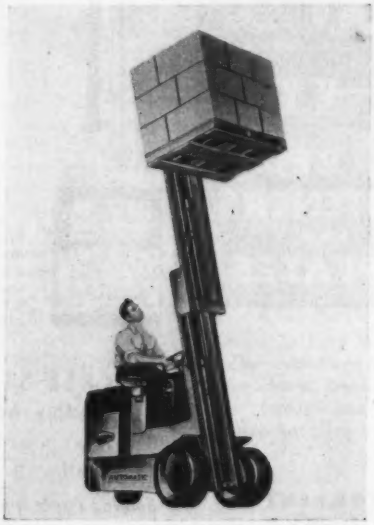
A dust hood weighing but five ounces has been introduced by the General Scientific Equipment Co., 2700 West Huntington St., Philadelphia 32, Pa.

The *G-S Fabric Dust Hood* provides ample visibility which is provided through a large, clear plastic window. The fabric, supported by a head frame, covers and protects the face, head, and neck down to the shoulders, protecting the worker from irri-

tating and nuisance dusts or sprays in operations such as cleaning boilers, furnaces of chimneys, paint spraying, and wherever dust or spray is objectionable. May be worn with goggles or respirator.

Seated Driver Operates this Stacker

A stacker on which the driver is seated, designed to bridge the gap between motorized hand truck and fork truck operations,



has been announced by the Automatic Transportation Co., 149 West 87th Street, Chicago.

Although engineered as a stacker, the battery-operated unit, named the *Transrider Stacker,* is equal in performance to any fork truck of the same capacity. Its special position in the materials handling field is shown by its design, which includes outstanding characteristics of the Skylift series of electric fork trucks. Its dimensions are small enough to permit operation in crowded quarters, and inside of box cars and trailers.

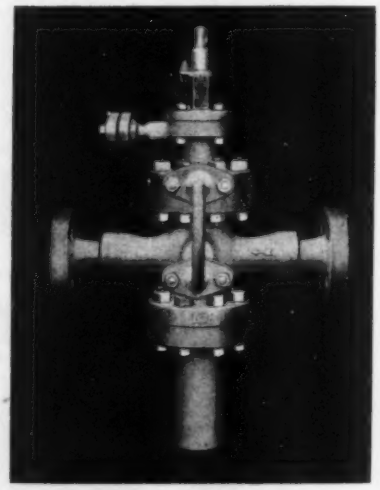
With a telescopic lift mechanism, the Transrider Stacker can lift to 130 in, despite having an over-all height of only 83 in, for clearance through standard factory and box car doors. Single lift, before the telescopic uprights are extended is 66 in.

Capacity of 2000 pounds with a 48-in load; 2500 pounds with a 36-in load; 2850 pounds with a 30-in load; and 3000 pounds with a 28-in load.

Pressure Reducing Valve

A new type of high pressure reducing valve employing the long proved internal pilot piston operated construction has been announced by Leslie Co., 159 Delafield Ave., Lyndhurst, N.J.

The new valve, known as Class HS, is designed for steam, air or gas service. It handles inlet steam pressures from 300 to 1500 psi and air or gas inlet pressures from



300 to 3000 psi. Reduced pressure range is from 100 psi to 600 psi. Maximum inlet temperature is 1000 Fahr.

Construction of the new valve embraces a cast chrome moly steel body with integral stellited seating surface. Available in sizes 1 in., 1-¼ in., 1-½ in., and 2 in. with flanges or welding ends.

No change of spring or diaphragm is needed from minimum to maximum reduced pressure setting. Valve is single seated, closing with the inlet pressure for positive dead-end shut off. Valve action is very fast with instant corrective reaction to any flow change, successfully used for high pressure steam soot blowers. Accuracy of regulation, maker states, is comparable to instrument control.

Low Temperature Insulation

An inorganic insulation material made of mineral wool and a resin binder that combines high fire resistance, immunity to many organic solvents, and moisture resistance with low heat conductivity is now being manufactured by Johns-Manville, 22 East 40th Street, New York 16, N.Y. *Zerolite,* as it is called, will pass the hot rivet test described in Maritime Commission specifi-

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MISCO offers sulphite pulp and paper manufacturers a dependable source for stainless steel castings in smooth cast condition or machined to a high degree of precision. We cast in various stainless steel analyses including hardenable grades as well as austenitic varieties such as 18-8 in its several modifications. The illustration shows typical examples of Misco stainless steel castings and finished products. We will gladly furnish you with information as to proper analysis, design, and application of stainless steel castings for machinery and processing equipment exposed to corrosion, heat and wear. Bulletins and engineering data sheets available upon request.

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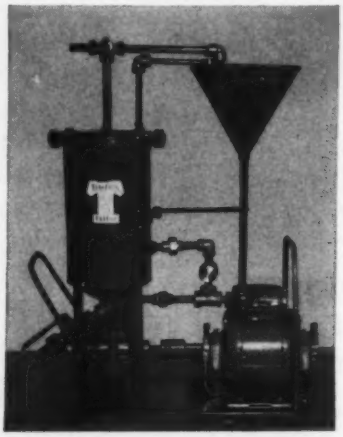
cation 32-MC-2. It is recommended particularly for the equipment used by the oil and chemical industries.

Among the organic solvents to which Zerolite is immune are benzol, methylethyl ketone, and petroleum fractions and derivatives. It is especially designed for service within the temperatures of minus 400 Fahr and plus 250 Fahr.

Portable Filter

A small, compact, portable filter, known as Model L50E has been developed by Titeflex, Inc., 419 Frelinghuysen Ave., Newark 5, New Jersey. This small filter is 17 in. long by 8 in. wide by 26 in. high, and weighs approximately 70 lb.



Available in stainless steel, brass, iron, and Saran, with rubber-lined tanks, this filter can be used on any chemical solution. It has a small positive displacement pump rated at 275 gph and powered by a 1/3 hp motor. This unit can be carried from tank to tank for batch work or can filter continuously on a specific tank. It is self-cleaning (does not have to be taken apart for cleaning), and requires no parts, such as bags, sheets, or pads.

Centrifugal Pump with Jet or Ejector

Suitable for handling a wide variety of liquids is a combination centrifugal pump with a jet or ejector, providing an economical, long-life pump for relative small capacity against high pressures.

Manufactured by Goulds Pumps, Inc., of Seneca Falls, N.Y., this pump is available in sizes ¼ hp to 5 hp, capacities up to 35 gals per minute, and pressures up to 190 pounds per square inch.

After the pump is initially primed, the centrifugal pump circulates the liquid through the unit, discharging first into the air separation chamber where positive separation of air or gas is accomplished. Liquid then goes through the nozzle and diffuser and thence back into the centrifugal pump. A high suction lift is obtainable by means of the vacuum created by the action of the jet. The suction connection leads directly into the area of high vacuum, while the discharge is taken from the top of pump casing.

▼

Higher Steam Pressures in Paper Mills

In discussing a paper on higher steam pressures read some time ago at a meeting of the ASME, a prominent consulting mechanical engineer stated that in one plant a 5,000 kw turbine-generator took steam at 250 lb psi pressure and exhausted it at 80 lb psi, the exhaust being used in a process system. In that way, the unit delivered power for less than one-half of one cent per kw-hr, taking into consideration all charges—overhead, maintenance, depreciation, interest, etc. Another prominent engineer stated that in industrial plants the highest practicable steam pressure and temperature always should be considered.

Because of the fact that comparatively few paper mills are operating at high pressure and temperature at the present time, there are no "standards" as yet, but they naturally will follow in time. Enough is already known about high pressure and high temperature operation so that engineers can predict closely the economies that will result. These things are no longer an entirely unknown quantity and in many respects we are pretty well through the experimental stage.—W. F. SCHAPHORST, M.E.

▽

Paper Machine Developments

(Continued from page 261)

time, it is also true of cylinder installations today. One of the main reasons is the wide speed range obtainable compared with a belt driven machine.

Conclusion

In discussing paper machine developments, we have, because of lack of time, touched briefly on only a few of them. Many developments open the way for a number of others just as a tree has several branches and each branch has several twigs. Paper machines will continue to be improved as long as paper is made. Developments seem to occur more rapidly at certain periods than at others. Educators maintain that the human mind absorbs learning rapidly for a period and then the rate of learning levels off on a "plateau" for a period. Similarly the development of paper machines seems to have moved forward in certain periods and stabilized in other periods. Perhaps through the depression and the War and possibly other circumstances, we appear to have recently been going through a period of very active development.

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New Catalogues and Publications

American Brake Shoe Co., Electro-Alloys Div., Elyria, O.—A six-page folder entitled "Solving Corrosion Problems with Chemalloy High-Alloy Castings," features two charts for quick selection of corrosion resistant alloys and is available on request.

Chicago Metal Hose Corp., Maywood, Ill.—"CMH Expansion Joints," Bulletin EJ-49, covers both Free-Flexing and Controlled Flexing corrugated type expansion joints in copper and stainless steel construction. Dimensional data for different sizes are given in tabular form. Copy is available on request.

Cochrane Corp., 17th St. & Allegheny Ave., Philadelphia 32, Pa.—Announcement has been made of 24-page bulletin on high pressure condensate return systems. Data on steam flow conditions and heat exchange characteristics are given. Write for copy of Publ. No. 3250.

Dodge Mfg. Co., Mishawaka, Ind.—Bulletin A-420 describes and illustrates application of this company's adapters, Taper-Lock bushings and Weld-On hubs.

Goodrich Co., B. F., Akron, O.—New catalogue sections give detailed descriptions, pictures and specifications of the company's "Burst-proof" steam hose and "Highflex" air hose. Copy available on request.

Hercules Powder Co., Wilmington, Del.—New and revised edition of basic technical booklet "Ethyl Cellulose, Properties and Uses" has been issued by this company. It is divided into three sections: Introduction, Formulation and Specific Applications. Also includes an appendix which identifies chemical trade names, used in booklet, to chemical makeup and manufacturer.

International Nickel Co., Inc., The, 67 Wall St., New York, N. Y.—Technical Bulletin T-3 on the resistance of high nickel alloys to corrosion by sulphuric acid has been issued. Performance of over 30 different nickel-bearing materials in a wide range of services is discussed. Contains 86 tables and 33 graphs and photographs.

Primarily of interest to the pulp and paper industry is a four-page booklet on corrosion and wear-resistant stock lines. Both booklets are available through the company.

Lawrence Machine and Pump Corp., 371 Market St., Lawrence, Mass.—A bulletin issued by this company describes the application of their pumps in chemical and process industries. Schematic sketches, pictures and a tabulation listing metals and alloys commonly used in pumps for handling liquids are included. Request Bulletin 203-4.

Leeds & Northrup Co., 4907 Stenton Ave., Philadelphia 44, Pa.—Bulletin ND44—96-708, "For Effective Neutralization of Industrial Wastes—Micromax Automatic pH Control," describes various industrial plants effectiveness in combating stream pollution through use of standard pH equipment. Copy may be had by writing the company.

Lincoln Electric Co., The, Cleveland, O.—A two-page booklet entitled "Lincoln Hardsurfacing Guide" explains in detail procedures for Lincoln hardsurfacing electrodes and their applications. Request Bulletin 469.

Marcus Transformer Co., Inc., The, 32-34 Montgomery St., Hillside 5, N. J.—A four-page bulletin describing and illustrating new line of air-cooled distribution transformers is available on request.

Permutit Company, The., 330 W. 42nd St., New York 18, N. Y.—A new bulletin, No. 2386, describes troubles caused by hard water, outlines properties of ion exchangers, explains and illustrates up-to-date ion exchange equipment. A description of the new manually or automatically controlled multiport valve is also given. Copy obtained on request.

Reliance Electric & Engineering Co., The, 1076 Ivanhoe Rd., Cleveland, O.—Three bulletins have been published by this company. Bulletin C-130 on the explosion-proof, corrosion-resisting a-c motor with design features enumerated and illustrated, and a brief description on new impregnating and baking techniques; Bulletin K-2025 explains functional adaptability of VSC Electronic Excitation Control System for production or processing operations requiring time-rate, smooth acceleration and deceleration, and points out advantages of the unit, ampere ratings for which it is made, etc.; Bulletin K-2001 describes and illustrates recently developed rotating regulator for voltage and current (tension) regulation known as "Reliance VSA Regulator." Schematic wiring diagrams and pictures covering two typical plant installations are shown. Copies of the three bulletins are available on request.

Roots-Connersville Blower Corp., Connersville, Ind.—Bulletin 32-33-B-13 covers Rotary Positive Gas Pumps and includes typical performance curves and other data, description of gears and bearings, comparison with other types, etc. Typical installations, covering a wide variety of industrial applications, comprise a two-page spread, and the booklet concludes with some discussion of available regulating and control devices. Write for copy.

Ryerson & Son., Inc., Joseph T., Box 8000-A, Chicago 80, Ill.—An eight-page engineering data bulletin describing Nitralloy and containing table of its compositions, hardness curves, mechanical properties, information on nitriding and heat treatment and typical applications, is available upon request at any of this company's plants in major cities.

Ryerson & Son, Inc., Joseph T., Box 8000A, Chicago 80, Ill.—Engineering data including load deflection, air flow comparison and free openings of both standard and flattened mesh types of expanded metal, is given in an eight-page bulletin just issued by this company. List of sizes with dimensions and weights, illustrations of mesh and typical applications, and data on expanded metal grating are included. Copy may be obtained from any of the plants of this company, or the address above.

Solvay Technical and Engineering Service, 40 Rector St., New York, N. Y.—Illustrated with tables, charts and graphs, the new 68-page technical bulletin takes up the general properties of hypochlorous acid and its salts, types of industrially important bleach liquors, and preparation of bleach liquors. Chlorination equipment and production of chlorine bleaches are also discussed. Request Bulletin No. 14.

Taylor Instrument Companies, 95 Ames St., Rochester 1, N. Y.—A new four-page bulletin presents Taylor's Liquid Level Transmitter and explains its corrosion resistant construction design. Contains application drawings and graphs. Write for Bulletin 98069.

Towmotor Corp. 1226 E. 152nd St., Cleveland 10, O.—Just published by this company are two pamphlets on job studies, showing how Towmotor trucks and tractors are being used to handle materials. Ask for Nos. 85 and 83.

Yale & Towne Mfg. Co., The, Philadelphia Div., Philadelphia, Pa.—A 12-page bulletin gives technical information about the new Load King Scale Weight Printer. Contains tables detailing available models, illustrations of important component parts, dimensions for space planning, examples of printed tickets and a bill of lading.

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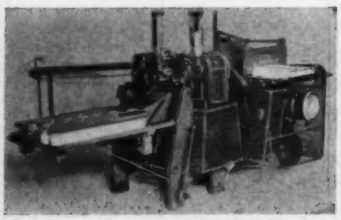

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BOOK REVIEWS

Hardwood Lumber Inspection—By Arthur W. Price and Raymond J. Hoyle. This pocket guide is a new, revised 1949 edition which contains information and help on grading hardwood lumber. Illustrations include six diagrams of boards with defects and cuttings marked, along with calculations necessary in determining the correct grade. Diagrams show how official rules are used in arriving at the right grade. The book sells for twenty cents and is available through New York State College of Forestry at Syracuse University, Syracuse 10, N. Y.

Textbook of Wood Technology—Volume 1—By H. P. Brown and C. C. Forsaith, professors of wood technology, The New York State College of Forestry, and A. J. Panshin, professor of forestry, Michigan State College. This book is a complete and revised edition of *Identification of the Commercial Timbers of the United States* by Professors Brown and Panshin. Factual information on the structure, identification, general properties, uses and major defects of commercial wood in the United States follows that of the earlier text but has been brought up to date. The International Code of Nomenclature, recently adopted by the U. S. Forest Service, has replaced the American Code formerly used. New references have been added and old references brought up to date. Provision has been made for the identification of a number of woods which were not previously included. Three important additions have been made to the descriptions of woods by species, namely, important uses of each wood are recorded at length and wherever possible linked to the structure and properties of the wood; selected references on the uses of woods are listed at the end of each description; a number of new species have been added. This text is one of The American Forestry Series. Price is $6.00 and it is available through McGraw-Hill Book Company, 330 W. 42nd St., New York 18, N. Y.

Trade-Marks—By H. Bennett, F.A.I.C., Technical Director, Glyco Products Co., Inc. A book of value to the individual or company who is confronted with the need for a trade-mark or trade name. The author has had many years of experience in creating trade-marks and ably discusses the legal and commercial aspects with particular attention to chemicals, chemical specialties and allied products, including a list of trade-mark and trade-name products and their suppliers and presents four different ways of finding or coining original names. Various types of available names are discussed in detail. Name finders, conveniently pocketed on the inside back cover, provide a wide range of pronounceable trade names. The book is priced at $10.00. Copies can be obtained through Chemical Publishing Co., Inc., Brooklyn, N. Y.

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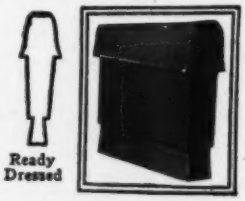

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PACKINGS

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NEW RAGS

Quotations to consuming mills, cents per pound or dollars per hundred pounds, f.o.b. New York, follow:

	per cwt.
Blue Overalls	6.75 to 7.00
Corduroy, Men's	5.75 to 6.00
Corduroy, Ladies'	5.75 to 6.00
Washables, No. 1	4.25 to 4.50
Percales	6.50 to 6.75
Light Prints, No. 1	6.25 to 6.50
Khaki Cuttings—	
Bleachable	6.25 to 6.50
Unbleachable	5.50 to 5.75
New White Canvas	11.50 to 12.00
New Mixed Blacks	5.25 to 5.50
Canton Flannels, Bleached	10.75 to 11.00
Shirt Cuttings—	
New White No. 1	10.50 to 11.00
White Shrunk	10.00 to 10.25
Silesias No. 1	8.50 to 8.75
New Unbleached	10.50 to 11.00
Fancy	6.00 to 6.25
Linen Cuttings—	
American	8.00 to 8.50
White	14.00 to 15.00
Grey	13.50 to 14.00

RAGS (Domestic)

OLD RAGS

Quotations to consuming mills, dollars per hundred pounds, f.o.b. New York, follow:

	per cwt.
Roofing—	
No. 1	1.15 to 1.20
No. 2	1.05 to 1.10
No. 3 and No. 4	.85 to .95
Twos and Blues—	
Repacked	3.00 to 3.25
Thirds and Blues—	
Repacked	2.85 to 3.00
Miscellaneous	2.25 to 2.50
Whites, No. 1—	
Repacked	4.75 to 5.00
Miscellaneous	3.75 to 4.00
White, No. 2—	
Repacked	3.50 to 3.75
Miscellaneous	2.75 to 3.00

RAGS (Foreign)

ex dock New York City

NEW RAGS

	per cwt.
New Dark Cuttings	Nominal
New Mixed Cuttings	
New Light Silesias	
Light Flannelettes	
Unbleached Cuttings	
New White Cuttings	
New Light Oxfords	
New Light Prints	

RAGS (Foreign)

ex dock New York City

OLD RAGS

	per cwt.
No. 1 White Linens	Nominal
No. 2 White Linens	
No. 3 White Linens	
No. 4 White Linens	
No. 1 White Cottons	
No. 2 White Cottons	
No. 3 White Cottons	
No. 4 White Cottons	
Extra Light Prints	
Ord. Light Prints	
Med. Light Prints	
Dutch Blue Cottons	
French Blue Cottons	
French Blue Linens	
Checks and Blues	
Linsey Garments	
Dark Cottons	
Old Shopperies	

ROPE and BAGGING

f.o.b. and ex dock New York City

Gunny No. 1—	per cwt.
Foreign	Nominal
Domestic	8.00 to 8.50
Wool Tares—	
Light	8.00 to 8.50
Heavy	8.50 to 9.00
No. 1 Scrap Bagging	6.00 to 6.50
Manila Rope—	
No. 1 large	6.00 to 6.25
No. 1 small	5.00 to 5.25
Sisal Rope—	
No. 1 large	5.00 to 5.75
No. 1 small	5.00 to 5.25
New Burlap Cuttings	8.00 to 8.50
Jute Threads—	
Foreign (Nom.)	6.50 to 7.00
Domestic	6.00 to 6.50
Strings—	
No. 1 sisal	5.00 to 5.25
No. 2 sisal	4.50 to 4.75
Soft jute	4.25 to 4.50
Mixed	2.50 to 2.75

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Shavings—	per ton
Hard White Env. Cuts	95.00 to 100.00
Hard White, No. 1	75.00 to 80.00
Soft White No. 1	70.00 to 75.00
Soft White, one-cut	85.00 to 90.00
Soft White, Misc.	55.00 to 60.00
Fly Leaf, No. 1	30.00 to 35.00
Fly Leaf, Woody, No. 1	25.00 to 30.00
No. 2 Mixed Col. Woody	20.00 to 25.00
Flat Stock—	
No. 1 Heavy Books and Magazines	18.00 to 19.00
Mixed Books	13.00 to 14.00
Ledger Stock—	
No. 1 White	40.00 to 45.00
No. 1 Mixed (Colored)	30.00 to 35.00
Manilas—	
New Env. Cuttings	60.00 to 65.00
New Env. Cuts, One-Cut	—
Extra Manilas	—
Manila Tab Cards, Free of Ground Wood	70.00 to 75.00
Colored Manila Tab Cards	40.00 to 45.00
Kraft—	
New Envelope Cuttings	65.00 to 70.00
Tripled Sorted No. 1 100%	30.00 to 35.00
New 100% Cor. Cuts	30.00 to 35.00
No. 1 Old Assorted	25.00 to 27.50
News—	
White Blank	60.00 to 65.00
Overissue	16.00 to 17.00
No. 1 Baled	11.00 to 12.00
Old Corrugated Containers	11.00 to 12.00
New Jute Corrugated Cuts	18.00 to 19.00
Mill Wrappers	7.00 to 8.00
Box Board Chips	5.00 to 6.00
No. 1 Mixed Paper	5.00 to 6.00

CHEMICALS

f.o.b. shipping point

Alum (Papermakers)—	
Lump, cwt.	4.05—
Ground, cwt.	3.80—
Powdered, cwt.	4.20—
Blanc Fixe—	
Pulp, bulk, ton	77.50—
Dry, barrels	85.00—
Bleaching Powder—	
Drums, cwt.	4.25 to 4.50
Casein (Domestic Standard)	
20-30 mesh (bags), lb.	
80-100 mesh (bags), lb.	.21.00 — 21.50
Argentine, lb.	20.25 — 20.50
China Clay—	
Domestic Filler	
Bulk (mine) ton	10.00 to 15.00
Domestic Coating	
Bulk (mine) ton	15.00 to 25.00
Imported (ship side)	
Bulk (lump) ton	22.00 to 30.00
Chlorine—	
Tank cars (wks) cwt.	2.40 to 2.70
Gelatine (silicin), lb.	1.25 to 1.35
Glyc. (C.P.) drums, lb.	.24½ to .25
Litharge, powd., bbl. lb.	.17 — .17½
Rosin (Gum)—	
New York, per 100 lbs.	
E	6.80—
F	6.80—
G	6.80—
WWX	7.00—
Rosin (Wood), carlots	5.70—

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Salt Cake—	
Dom. bulk (wks) ton	26.00 to 28.00
Imp. bulks on dock— (Atl. ports) ton (Nom.)	27.00 to —
Soda Ash—	
Bulk (works), cwt.	1.10 to 1.20
Paper Bags, cwt.	1.30 to 1.40
Barrels, cwt.	1.70 to 1.80
Soda (Caustic)—	
Solid drums, cwt.	3.05 to 3.10
Ground and flake, drums, cwt.	3.45 to 3.50
Sodium Silicate—	
60 deg. 55 gal. drums, (works) cwt.	1.65 to 2.05
40 deg. 55 gal. drums, (works), cwt.	.80 to 1.45
Starch—	
Pearl, 140 lb. bags, cwt.	4.67—
Pearl, barrels, cwt.	4.67—
Paper, (8p.) bags, cwt.	4.67—
Powdered, barrels, cwt.	4.78—
Sulphur (Crude)	
(Mine) bulk, long ton	16.00 to 18.00
Talc—	
Dom. 100 lb. bags (mine) ton	22.00 to 28.00
Canadian	35.00 to 45.00
Titanium Dioxide—	
Barium Pig, bbls., lb.	18 to .19½
Calcium Pig, bbls., lb.	18 to .19½
Zinc Sulphide, bbls., lb.	11.50 to 11.75

WOOD PULP

Prices, dollars per short, air dry, ton, on dock American ports and f.o.b. shipping points with former OPA freight allowances, are:

Bleached sulphite, Swedish	130.00—
Bleached sulphite, Finnish	132.50—
Bleached sulphite, dom.	126.00 to 130.00
Easy bleaching sulphite	—
Unbleached kraft, Finn.	112.50—
Unbleached sulphite, Swed.	118.00 to 124.00
Unbleached sulphite, Fin.	122.50 to 126.50
Unbleached sulphite, dom.	115.00 to 123.00
Unbleached kraft, Swedish	105.00 to 117.00
Unbleached kraft, northern	105.00 to 112.50
Unbleached kraft, southern	95.00 to 105.00
Bleached sulphate, Swedish	136.00 to 140.00
Bleached soda, domestic	125.00 to 130.00
Sulphite screenings, dom.	40.00 to 50.00
Sulphate screenings, dom.	40.00 to 50.00
Groundwood, domestic and Canadian	75.00 to 80.00

PAPER

f.o.b. New York City

	per ton
Boards—	
Binders	94.00—
Chip	75.00—
Chip, tube and can	80.00—
Chip, full blending	82.50—
Chip, sgl. mla. lined	80.00—
Coated, white patent	
.018	120.00—
.020 and heavier	110.00—
Kraft liner	95.00 to 105.00
Filled News	77.50—
Container	90.00—

Book Papers—f.o.b. mill with quantity, weight, manufacturing and other differentials allowed:

(Per cwt. in ton lots)
Uncoated (Untrimmed)

Book, White (M. F.)—	
A Grade E. F.	14.40—
B Grade E.F.	14.40—
A Grade S. C.	15.90—
B Grade S. C.	14.80—
No. 2 Uncoated Offset 4 sides, White	—
Machine Coated White (Trimmed 4 sides)	
No. 1 Glossy	20.15—
No. 2 Glossy	18.90—
No. 3 Glossy	18.15—
No. 4 Glossy	—
No. 2 Offset	14.60—
C1S Litho (Varnish)	—
C1S Litho (Non-Varnish)	—

Writing Papers—f.o.b. mill with zone, quantity, packing and other differentials allowed:

Rag Content Bond— (In Ton Lots)	per cwt.
Extra 100% Rag	49.30—
100% Rag	42.70—
75% Rag	33.10—
50% Rag	28.10—
25% Rag	24.85—

Rag Content Ledger— (In Ton Lots)	per cwt.
Extra 100% Rag	50.50—
100% Rag	43.90—
75% Rag	35.15—
50% Rag	29.40—
25% Rag	26.15—

Sulphite Bond—	per cwt.
Air dry, watermarked	—
No. 1 watermarked	18.50—
No. 2 watermarked	17.55—
No. 4 watermarked	16.80—

Sulphite Ledger—	per cwt. Zone
No. 1 watermarked	18.85—
No. 2 watermarked	18.70—
No. 4 watermarked	18.10—

Glassine (f.o.b. mill)—	per cwt.
Embossed (25 lb. up)	—
Bleached (25 lb. up)	—
Unbleached (25 lb. up)	—
Greaseproof—	
Bleached (25 lb. up)	—
Unbleached (25 lb. up)	—

News—	per ton
Rolls, Standard Contract)	100.00 to 103.00
Rolls (Spot)	(Nominal)
Sheets	119.00—

Tissues (Carlots)—	per ream
White No. 1	1.70—
White No. 2	1.40—
Bleached Anti-Tarnish	—
Colored	—
Anti-Tarnish Kraft	1.45—
Manila	1.60—
Napkins, semi-crepe (12½ lb. to M shts.) per cs.	.80—
Napkins, full crepe and emb'sed (12½ lb. to M shts.) per cs.	.80—
Toilet, Bleached (M. shts.) per cs.	8.75 to 10.00
Toilet, Unbleached (M. shts.) per cs.	7.50 to 10.00

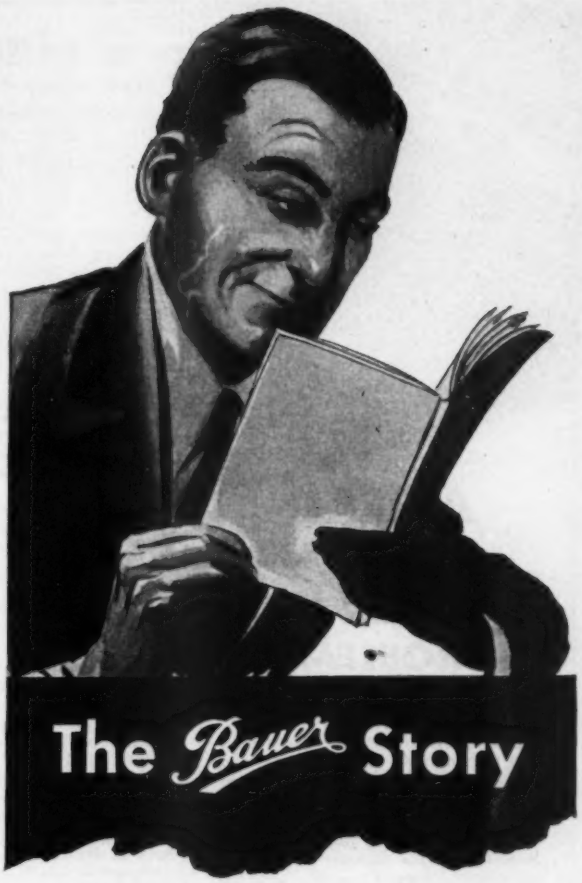
Towels—	per case
Bleached	4.75—
Unbleached	4.00—

Wrappings (Kraft)—	per cwt.
Super-Standard	9.00 to—
No. 1 Wrapping	7.50 to 8.00
Standard Wrapping	7.00 to 7.25
Standard Bag	6.50 to 7.00
Variety Bag	—

Wrappings (Sulphite and Bleached Kraft)— (Rolls, f.o.b. mill)	
Bleached Papers—	per cwt.
M.F. & M.G. Waxing, 20 lb. (Carloads only)	—
(10,000 lb.)	—
Drug wrapp., 35 lb.	—
Unbleached Papers—	
Com. Gr. Butch. 40 lb.	—
No. 1 Butchers	—
No. 1 Imit. Parch. & Dry Fin. Groc. Sulphite, 30 lb.	—
No. 2 Imit. Parch. & Dry Fin. Groc. Sulphite, 30 lb.	—
Steam Finish, 50 lb.	—
Water Finish, 50 lb.	—

Manilas—	
Envp. Mla., Sub. 16-40 (No. 1)	—
Envp. Mla., Sub. 16-28 (No. 2)	—
Envp. Mla. (Prices based on large sheets untrim'd ream marked, in bdls.)	—

Wrapp Mla. 35 lb. up—	
No. 1	—
No. 2	—
M.G. Sulphite and Kraft (other than Waxing)	
Grade B20 lb.	—
Grade A-22 lb.	—



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BAGASSE
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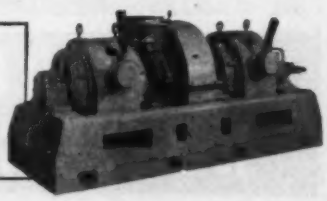

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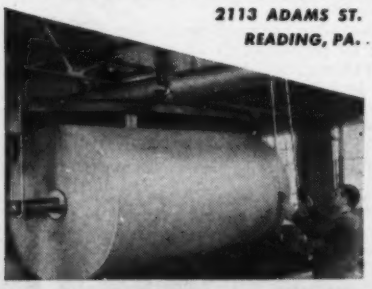

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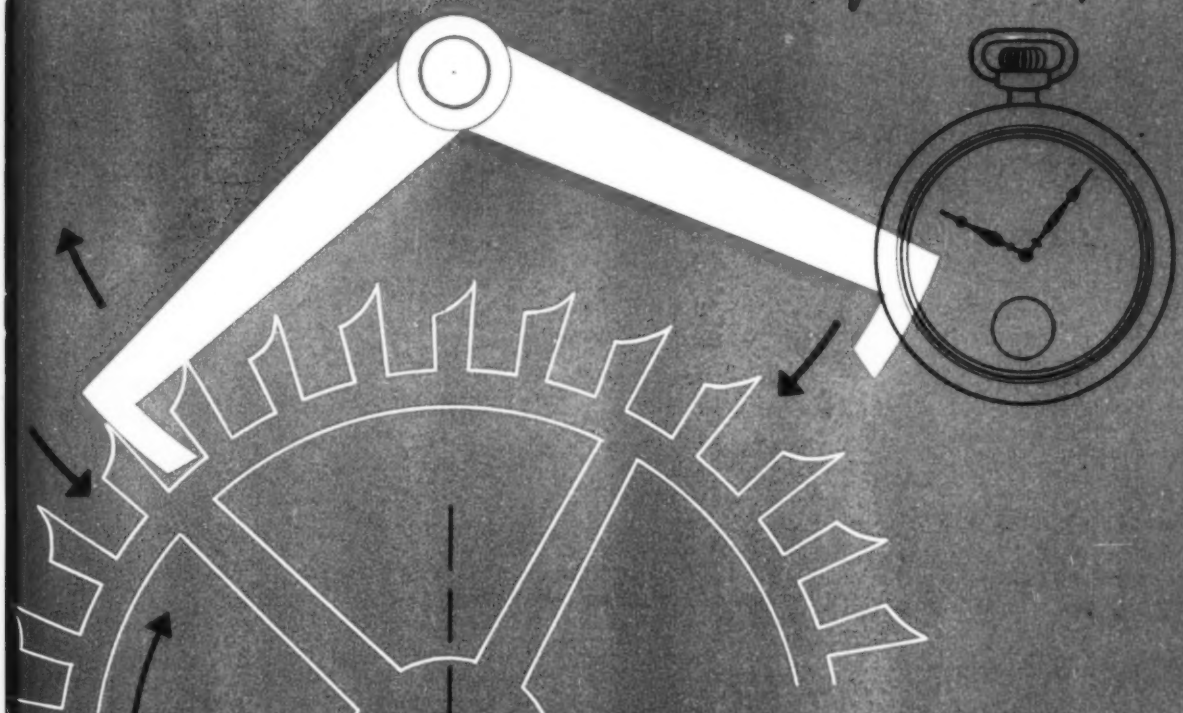
ratchet: *a hinged tongue that prevents a toothed wheel from turning backward*



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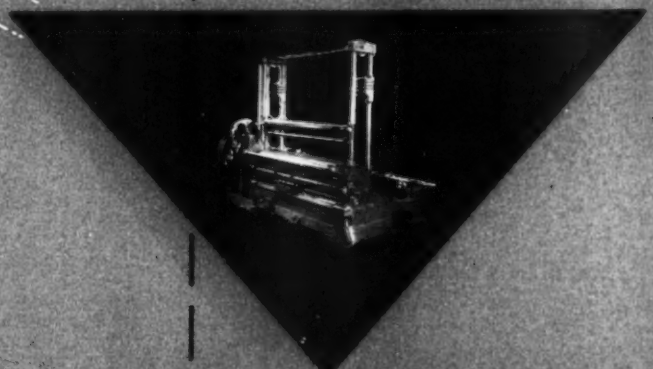

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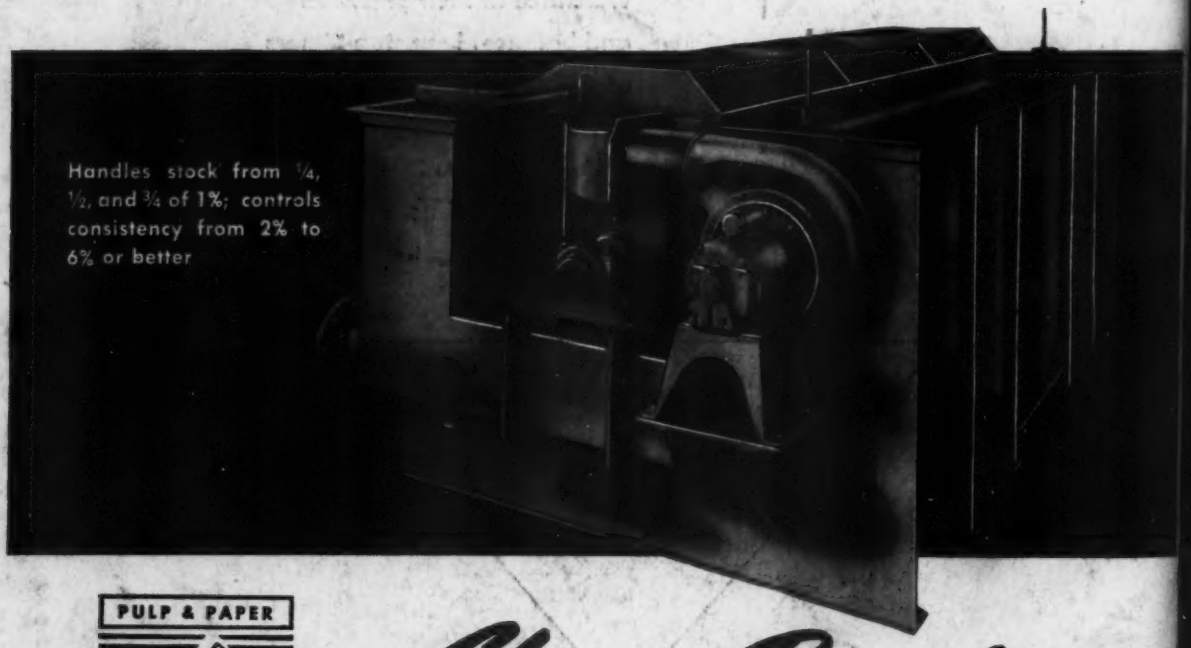

Handles stock from ¼, ½, and ¾ of 1%; controls consistency from 2% to 6% or better

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